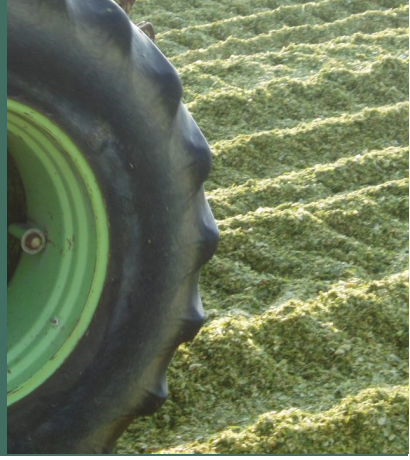
Champlain Valley CROP, SOIL & PASTURE Team

THE UNIVERSITY OF VERMONT EXTENSION

FALL 2023 NEWSLETTER



Focus on Agriculture

Joshua Faulkner, Research Associate Professor and Farming and Climate Change Program Coordinator

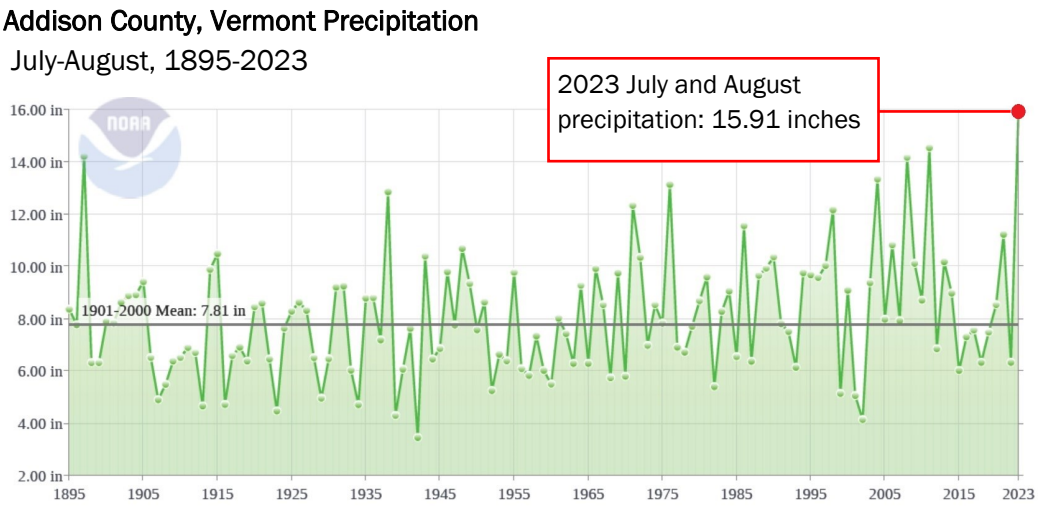


Figure 1 *NOAA National Centers for Environmental Information.*

This past growing season was one of the most challenging that many of us have ever seen, from the extremely damaging late freeze to the excessive wetness to the flooding. According to a survey by VAAFM about the July floods, Addison County farmers experienced more financial damage than any other county in the state. This does not account for additional crop losses due to the wettest July & August on record (Figure 1). Some parts of the county received over 20" of rainfall during those two months, which is almost three times the average amount!

All this reminds me that there truly is no 'normal' growing season anymore. With two '100-yr storms' occurring within 12 years and several years of drought in between, we might do well to eliminate 'normal' from our vocabulary. The agricultural community across the country is increasingly thinking about how to make farming practices and systems not just 'resistant' but 'resilient.' Resistant systems can appear strong, but when they fail, they crumble. Resilient systems may not appear as strong initially, but when they take a hit (like a flood), they bounce back quickly. Here in Extension, we are thinking a lot about this and what can make our local farming systems more resilient. For example, what role does soil health play in improving soil drainage? We are currently collecting data on farms with varying levels of soil health to understand if certain practices led to improved yields in this extreme year. With most challenging situations, there is a chance to learn something new and make improvements for the future. After all, remaining profitable is as much about resilient systems as it is about resilient people, and the Vermont farming community is full of those.

We hope you enjoy our fall newsletter. We have had two new faces join Extension since our last edition. It's exciting to continue to grow, and we look forward to the renewed search for an agronomy faculty in our office. As we move into the winter, I encourage you to think about what aspects of your operation you can make more resilient. I assure you that we'll be doing the same.

Contact Joshua at **joshua.faulkner@uvm.edu** .

Can manure nutrient sensor technology improve manure management?

Abigail Augarten, Agronomy Specialist | abigail.augarten@uvm.edu

Applying the appropriate rate of manure based on nutrient content is essential to protect water quality and economic return. Overapplications can lead to increased nutrient runoff, while underapplications can be just as detrimental by limiting yields and leaving producers with more manure and less storage capacity. The current best management practice is to base manure applications on manure analysis from previous seasons. One drawback of this approach is that manure nutrient concentrations can vary. This is particularly true in seasons like this year, where high rainfall dilutes the nutrient content of manure in storage pits. Having real-time manure nutrient concentrations can improve how manure is utilized.

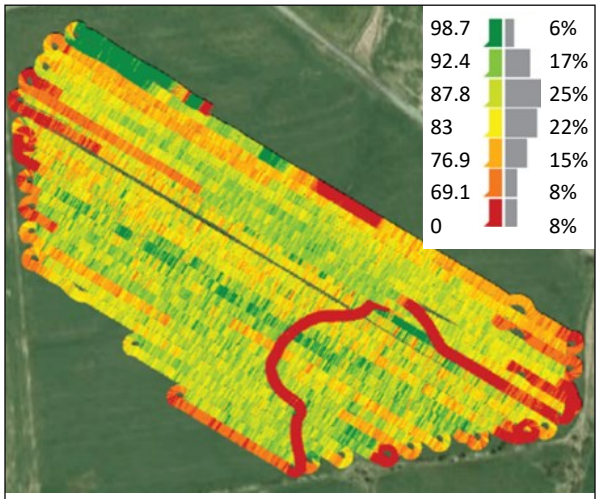


Figure 1 *John Deere map of P_2O_5 application (lb/ac)*

Emerging precision agriculture and sensor technologies raise the possibility of evaluating manure nutrient content at the time of application. The John Deere HarvestLab™ 3000 with Manure Constituent Sensing analyzes liquid manure 4,000 times per second and connects to flow meters and GPS tractor technology, allowing the operator to adjust applications to a target nutrient application rate of nitrogen, phosphorus (P_2O_5), and potassium (K_2O). Field maps are generated to depict flow and nutrient application rates (Figure 1).

Our team is evaluating this technology in collaboration with Matthew's Trucking and with support from a NRCS-VT Conservation Innovation Grant. The goal is to determine the sensor's accuracy and calibrate the technology to better estimate manure nutrient content. As manure is being applied, we take 1-3 grab samples, which are analyzed for nutrient content at the lab to calculate nutrient application rates.

We compared nutrient application rates calculated from the in-field grab samples to those estimated by the sensor and the farm's nutrient management plan (NMP) five-year manure nutrient (Figure 2). Compared to the in-field grab samples, the manure sensor tended to overpredict P application rates while the NMP five-year average was typically more accurate. For total N the manure sensor better estimated concentrations.

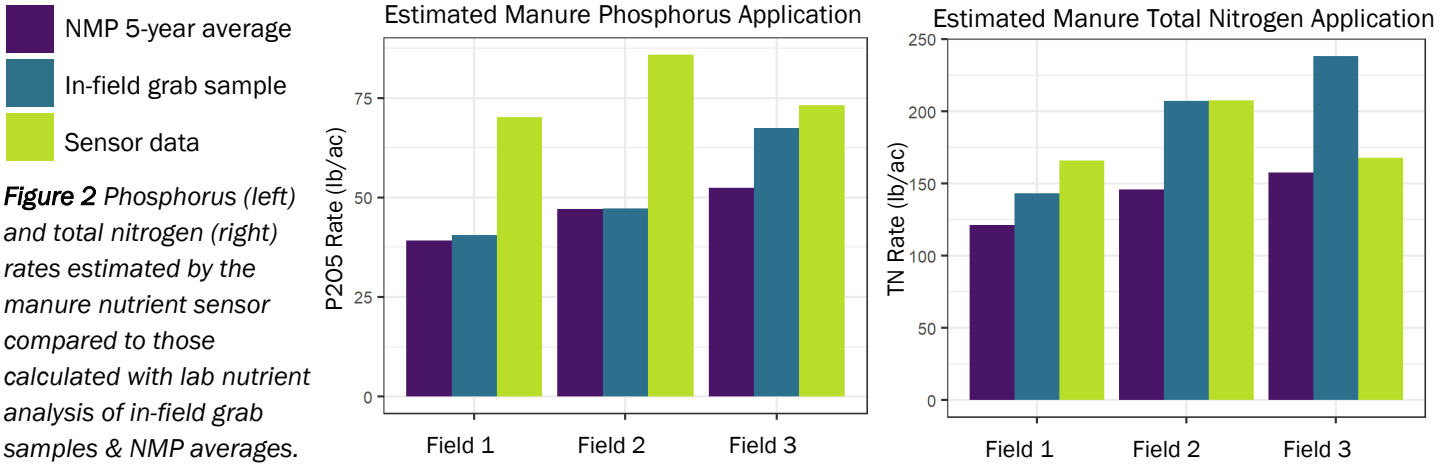


Figure 2 *Phosphorus (left) and total nitrogen (right) rates estimated by the manure nutrient sensor compared to those calculated with lab nutrient analysis of in-field grab samples & NMP averages.*

While manure nutrient sensor technology offers potential to improve water quality and economic viability, there is more work to be done. Continued data collection is necessary to calibrate this sensor technology to better align with laboratory analysis. This may then open new possibilities for precision manure management on VT farms.

New Staff in the Middlebury Office

Marie English, Research Specialist | marie.english@uvm.edu

Marie will be joining the Dairy Soil and Water Regeneration Project (DSWR) in Addison County as the lead research specialist. On this project, she will focus on measuring the effects of different conservation efforts to improve soil health and reduce greenhouse gas emissions. Since 2020, Marie has been a lab manager and research technician on a wide variety of global change ecology projects in the Adair Lab at UVM. She loves field work and has a range of technical instrumentation experience that includes running meteorological stations and in situ soil sensors in agricultural systems and managing gas chromatographs and carbon and nitrogen analyzers in the lab. She earned a BS in Environmental Science from UNC Chapel Hill and her master's research at the University of Tennessee was focused on the effects of biodegradable plastic mulch treatments on soil quality. During this time, she gained field and lab experience conducting a comprehensive soil carbon pool analysis, temperature incubation experiment, and soil microplastic analysis.

This summer, the DSWR project was busy measuring greenhouse gas emissions with new analyzers, capturing flood data, and collecting soil samples. A unique part of this study is continuing monthly measurements of greenhouse gas emissions through the winter to better inform models used to calculate carbon sequestration in dairy feed production. Moving into the Fall, Marie is looking forward to analyzing data, processing soil samples in the lab, and contributing to a variety of other soil and climate change-related research projects.

Conservation Effects Assessment Project (CEAP) Update

Ben Tutko, Research Specialist | benjamin.tutko@uvm.edu

Since late 2019, UVM Extension has partnered with the NRCS and other agencies to collect data for USDA's Conservation Effects Assessment Project. Portions of the Dead Creek and Little Otter Creek watersheds are monitored for flow rate every 15 minutes to trigger automated samplers when storms cause runoff and water levels rise. Collected samples are then analyzed in the lab for phosphorus, nitrogen, and sediment. To no surprise, this summer was historic for storm sampling. The extraordinary rainfall totals (see page 1) triggered more runoff events this summer (May-August) than the combined total of summer events for the last three years. Data on the phosphorus and other nutrient levels in the stormwater runoff are still being analyzed.

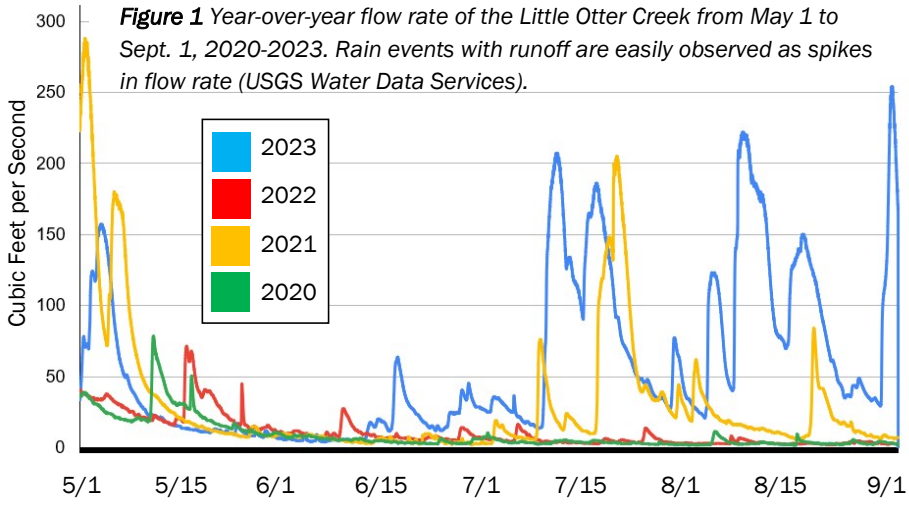


Figure 1 *Year-over-year flow rate of the Little Otter Creek from May 1 to Sept. 1, 2020-2023. Rain events with runoff are easily observed as spikes in flow rate (USGS Water Data Services).*

Upcoming Events

Water quality and soil health field day at Blue Spruce Farm:
November 16, 2023 from 10 - 12
Rattlin Bridge Road, Bridport

Save the date for the No-Till Cover Crop Conference:
February 22, 2024 in South Burlington

VISIT OUR WEBSITE FOR MORE INFORMATION, AND STAY TUNED FOR OUR WINTER WORKSHOP SERIES!

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This newsletter is edited and managed by Anna Elewski. Questions? Reach out to anna.elewski@uvm.edu.

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