Agenda and Attendee List

Northeast Regional Committee on Soil Testing
NECC-2312
Thursday and Friday, October 3-4, 2024
Grey Towers (USFS), 122 Old Owego Turnpike, Milford, PA 18337

Attendee List (name/affiliation):

Add name here if you plan to attend
Charlie White, Penn State
John Spargo, Penn State
Quirine Ketterings, Cornell
Sanjay Gami, Cornell
Amy Shober, University of Delaware
Sapana Pokhrel, University of Delaware
Sam Corcoran, UMass
Haiying Tao, UConn
Abigayle Ward, UConn (graduate student)
Dawn Pettinelli, UConn
Bruce Hoskins, UMaine
Joseph Heckman, Rutgers (Oct 3 only)
Alon Rabinovich, Rutgers (Oct 3 only)
Stephanie Murphy, Rutgers
Karen Gartley – University of Delaware
Renuka Mathur, University of New Hampshire (virtual)

Agenda

Thursday, 10/03/24

Time	Topic	Led By
1:00 pm	Welcome, Discussion of Agenda • New/returning participant introductions • Review & Approval of 2023 Minutes • Election/Appointment of 2024 Chair (alphabetically; Rhode Island, Vermont, or West Virginia up next?)	C. White
1:30 pm	Report from Joint soil testing meeting in 2024	J. Spargo
1:45 pm	NAPT update	J. Spargo
2:00 pm	Conversion between MM and M-3 soil test P for CT soils (Also possibly discuss, soil health course, Soil credits for CPSS, Drone seeding cover crops, NE branch meeting?)	A. Ward, H. Tao

2:30 pm	Rock powder as a Soil Amendment / Soil Fertility Research on Nickel Nutrition	J. Heckman, A. Rabinovich
3:00 pm	High OM Garden Bed Mixes Regional Project	S. Corcoran
3:15 pm	Regionalizing Labs in the Model of NPDN	A. Shober
3.30 pm	Break	
4:00 pm	Update on regional and national lime work	A. Shober
4:20pm	CaCl2-pH as a Routine Method	B. Hoskins
4:30 pm	Observations about Organic Matter measurement	S. Murphy
5:00 pm	Adjourn	
6:30 pm	Dinner Reservations at the Dimmick Inn	C. White

Friday, 10/04/24

Time	**Topic**	**Led By**
8:00 am	State Reports	All
9:30 am	Discuss Revisions to Methods Manual	B. Hoskins
10:00 am	Regional P Index Discussion	Q. Ketterings
10:15 am	Break	
10:30 am	Salinity assessment with routine soil test	S. Pokhrel
11:00 am	Microbial biomass as possible indicator for yield and manure management? Q. Ketterings	
11:30 am	Summarize goals for 2025	All
12:00 noon	Adjourn	

Minutes
Northeast Regional Committee on Soil Testing
NECC-1812
Thursday and Friday, October 3-4, 2024
Grey Towers (USFS), 122 Old Owego Turnpike, Milford, PA 18337

In attendance:

- Stephanie Murphy, Rutgers <slmurphy@njaes.rutgers.edu>
- Joseph Heckman, Rutgers <heckman@njaes.rutgers.edu> (Oct. 3)
- Alon Rabinovich, Rutgers (Oct 3)
- Dawn Pettinelli, University of Connecticut <dawn.pettinelli@uconn.edu>
- Hailing Tao, University of Connecticut <haiying.tao@uconn.edu>
- Abigayle Ward, University of Connecticut: abigayle.ward@uconn.edu
- Bruce Hoskins, University of Maine <hoskins@maine.edu>
- Sam Glaze-Corcoran <sglazecorcor@umass.edu>
- Bryan Hopkins NAPT <hopkins@byu.edu>
- John Spargo, Penn State <jts29@psu.edu>
- Amy Shober, University of Delaware <ashober@udel.edu>
- Eugenia Pena-Yewtukhiw, WVU <Eugenia.Pena-Yewtukhiw@mail.wvu.edu>
- Quirine M. Ketterings, Cornell University <qmk2@cornell.edu>
- Sanjay Gami, Cornell
- Karen Gartley – University of Delaware
- Renuka Mathur, University of New Hampshire (virtual)

Thursday, 10/03/24

Time	Topic	Led By
1:00 pm	Welcome, Discussion of Agenda • New/returning participant introductions • Review & Approval of 2023 Minutes • Election/Appointment of 2024 Chair (alphabetically; Rhode Island, Vermont, or West Virginia up next?)	C. White
1:30 pm	Report from Joint soil testing meeting in 2024	J. Spargo

I. The NECRA-013, SERA-6, NECC-2312 Joint Meeting
   a. June 3rd to 5th in Minneapolis, MN
   b. Attendance: ~35 in-person and ~24 virtual (NECC: Amy Shober, Renuka Mathar, Eugenia Pena-Yewtukhiw, John Spargo)
   c. Sponsors: ALTA, TSI, Elementar, TSP, Spectro, NAPT, ALP
   d. NRSP-11 (NRSP 11 (Building Collaborative Research Networks to Advance the Science of Soil Fertility: Fertilizer Recommendation Support Tool (FRST))
      i. First annual NRSP-11 meeting was held in conjunction with the Joint Meeting, 9 am to noon on June 3rd

1. Four talks/discussions: Spargo – Origins of FRST; Slaton – National database review; Osmond – Data submission template; Yost – Sulfur MDS
2. Committee updates: Culman – SDS; Gatiboni – Calibration; Jones/Shober – Lime calibration; Tao, Wang, Yost, Kaiser - Regional FRST CIGs

e. Five sessions over 2 days (noon on Mon. Jun 3rd to 2 pm on Tues. Jun 4th)
   i. Data management: Sylvie Brouder (Perdue), Michal McCullough (NAL), Shannon Farrell (UMN)
   ii. Soil test correlation: Rasel Parvej (LSU), Antonio Mallarino (ISU), Craig Struve (Soil View)
   iii. Sulfur: David Vincent (TSI), Brenda Tubana (LSU), Daniel Kaiser (UMN), John Spargo (PSU)
   iv. Lime and soil carbon: John Jones (UWI/UIL), Amy Shober (UDE), Andrew Margenot (UIL)
   v. ManureDB: Melissa Wilson and Nancy Bohl Borman (UMN)
f. Tuesday afternoon, tour of the UMN Arboretum,
g. Tuesday evening, dinner cruise on the MS river,
h. Wednesday morning, regional meetings.

II. NECC will host the next Joint Meeting in 2028 (WV 25, CT 26, DE 27, ME 28)
   a. Should we ask one state to host and another to organize the agenda?

III. The 18th International Symposium on Soil and Plant Analysis (ISSPA) will be held in Durham, NC June 9-14, 2025.
   a. Kristen Hicks (NCDA) is the current chair of SPAC and is organizing the meeting
   b. Registration is now open, https://www.isspasymposium.org/

1:45 pm NAPT update J. Spargo

I. Chair of NAPT OC
   a. John Spargo (PSU), 2023-2024
   b. John Breker (Agvise), 2025-2026

II. The laboratory/logistics contract transition from USU to BYU
   a. John Lawley will retire in early 2025. He has handled laboratory logistics for over 20 years.
   b. After lengthy discussion and negotiation, it was agreed that BYU would take over the Coordinator and Laboratory/Logistics contracts.
   c. New contracts will go into effect January 1, 2025
   d. Updated organizational chart: Bryan Hopkins, Director; Shannon Nelson, Associate Director and Lab Manager: Tyler Hopkins, Data Processing.

III. PAP
   a. New stamps with the current year: *PAP Approved Lab, Year*
   b. New, approved "*by method"* option
   c. Revised Code of Ethics

IV. ALTA<>NAPT collaboration
   a. ALTA certification
   b. Training and workshops
   c. ALTA representation on the NAPT OC

V. Does NECC 2312 have any recommendations or suggestions for improvements to the NAPT?

VI. Others

- Soil testing association: IL Soil testing association-monthly webinar; certification program botanical plant testing; Bob designed OSP; will accept PAP data
- How PAP works: you select the methods that you want to request in the beginning of the year
- Concern of soil health methods, not enough population for any kind of evaluation, and not enough standardization.

2:00 pm Conversion between MM and M-3 soil test P for CT soils A. Ward, H. Tao
(Also possibly discuss, soil health course, Soil credits for CPSS, Drone seeding cover crops, NE branch meeting?)

- Linear, quadratic, and cubic, and multivariate equations were conducted for converting MM-P to M-3P for soils collected from top 10 soil series from agricultural fields in CT. Quadratic model seems give the highest % of correct estimates, followed by multivariate and cubic equations, and the % of correct estimates is highest when MM-P is in below optimum range. The % of correct estimates are low (0-43%) when MM-P values are at optimum or above optimum range.
- Suggestions:
  - Including OC maybe helpful improving model
  - High P – prediction efficiency is low
  - Scalar vs ICP
  - Try random forest approach for data analysis
  - In the multivariate model, which factor is the biggest driver?
  - NY: high MM-Al soils had higher M3-P/MM-P
  - FRST soils dataset: include them in the analysis!

2:30 pm Rock powder as a Soil Amendment / Soil Fertility Research on Nickel Nutrition J. Heckman, A. Rabinovich

- Application
  - Rock powder is sourced from Trap Rock Industries in Kingston, NJ.

    - Crush stone byproduct is the rock powder used in the project for soil amendment
    - Did a nutrient analysis using soil test method, high in Mg, Ca, optimum K, blow P, some micronutrients, high pH which could be liming material
    - Applied on oats and clover in pots
- Results
    - Soil pH increased when increased application rates
    - ECC of 5-6
    - M3- P is lower over time when applied, correlation with rates negatively, Increased B, Cu, Mn and Zn reduced, S reduced, Fe not affected
    - Sudan grass in pots: may increase yield
    - Sweet corn Promix vs 50/50 blend: promix-Fe deficiency and mix looked fine but later growth stage promix plants were taller
    - Farm field application: difficult to spread using a solid manure spreader;
- Potential applications: CO_2 capture through basalt weathering; liming; mitigate excess of extractable P in high P soils
- Lithos C in PA company - sell C credit from selling farmers industrial basalt byproduct, toll 150 miles with incentive to farmers - Charlie found the application can increase pH; CCE as well but small; 12 t/a is equivalent to 0.5 ton/a limestone but when applied it is not as effective at all; particle size is very small.
- Why reduced M3-P?
  CO_3 precipitated P- but may not because liming didn't effect M3-P; HCO_3 leached? reach 10,000ppm CO_2 production via plants and microbs, but with NT-application, since it is not incorporated; may not reach 10,000ppm CO_2 production;
- Maybe high in clay sized particles; may amend organic soils with minerals
- Metal contaminants? – less than TSP
- There is a review article on this material from Brazil
- Crop and Soil News article: M-e on IL and MN soil-predict Ni deficiency; Ni prevents blossom end rot by assisting Ca uptake and move to organs; Alan published an review article on Ni in Ag and food security;
- Fertility often focuses on yield response but should also include quality and disease and pathology

3:00 pm High OM Garden Bed Mixes Regional Project S. Corcoran

- Received funding from USDA-SARE
- Samples received: 4% >20% and 18% at 10-19%
- These sols are high in Ca and Mg but not K
- Recommendations for filling raised beds are highly variable on LGU factsheets from 50:50 to 10:90 compost:soil.
- But Oldfield at al. 2020 found OM and yield in relationship showing OM 5-6% resulted highest yield then reduce as OM increased.
- <u>Proposal goals:</u> validate routine vs SME recs relative to OM; revisit sampling methods; revisit water infiltration given high OM; study leaching in high vs low SOM; etc. nutrient retention, CEC, etc.

- Experimental plan:
- Education
- Potential contamination from the raised bed wood: e.g. Ar
- Lead screen level threshold: 200 VS 400 EPA number; PSU has soils can be used for lead correlations purposes. TSM method vs MM-lead method correlation.
- What is the test method for lead screening? Different states use different lead extraction methods. The EPA 3050 standard method 351.

3:15 pm Regionalizing Labs in the Model of NPDN A. Shober

- NPDN; LIMS system.
- Share protocols regionally in the LIMS system.
- Reach out to Josh
- UMass, UConn, Penn State has similar work maybe 10 yrs ago;

3.30 pm Break

4:00 pm Update on regional and national lime work A. Shober

- Should look at NO_3 levels - mineralization may affect the pH
- Hand stir vs machine stir: instead of stir using reciprocal shaker, the pH came up much lower; reaction time makes big difference on pH especially with high OM heavy texture soils; so went back to hand stir.
- FRST lime pilot study:

4:20pm CaCl2-pH as a Routine Method B. Hoskins

- 1:1 water pH vs 1:1 $CaCl_2$ pH: high tunnels with high EC high differences; Mehlich buffers (water+buffer vs $CaCl_2$+buffer): differences are very small, so doesn't effect the lime recommendation when use buffer.
- Should we switch to $CaCl_2$ pH?

4:30 pm Observations about Organic Matter measurement S. Murphy

Sulfur and Boron – White

- Noted that although there are sulfur and boron chapters with their own methods, most of us run them with our routine extracts but we don't have recommendations.
- Someone noted a boron spike when peristaltic pump tubes are replaced.

5:00 pm Adjourn

6:30 pm Dinner Reservations at the Dimmick Inn C. White

Friday, 10/04/24

Time	Topic	Led By
8:00 am	State Reports	All

Connecticut

- Almost 12,000 samples
- New Timberline TL-2900 and Skalar BluVision discrete analyzer
- Dawn Pettinelli retiring in December
- Plans to move lab to renovated building on campus 2025
- Amelia Magistrali hired as Extension Soil Health person
- Doing some baseline high tunnel/raised bed MM & SME for grant proposal
- Research (Haiying Tao)– MM Critical Conc for P, P & K response trials, Cover cropping & Precision Experimentation

Delaware

- See Amy Shober above.
- Since Ca, Mg, Cl, Na, SO4 = salinity, could we use M3 as measure of salinity

Maine

- About 14,000 samples
- Price increase – slight drop in sample #
- Noted total sorbed metals requested by cannabis industry
- PFAS major research focus in ME
- Also biochar/cover cropping/high tunnel fumigation
- $5 million earmarked for renovation/equipment
- New soils faculty – Allison King – soil health

Massachusetts

- About 13,000 samples mostly homeowners
- Sam Glaze-Corcoran full time now
- State of MA interested in Healthy Soils Action Plan
- New hires in Production Ag and Urban Ag Extension -start 2025
- Cover crops/C sequestration

New Hampshire

- Renuka Rao – about 3000 soils, mostly home gardens
- Updating LMS system
- FRST lime project – submitted samples
- Biochar/Arsenic in wells

New Jersey

- Seal pH robot – stirring depth adjustments
- Texture – Perio units = automated hydrometer
- New fact sheets on soil health

New York

- No more Cornell soil pH kits
- Research lab closed
- Incubation study for manure credits
- P balance/soil health/satellite drone imagery
- Online single strip spatial analysis tool
- Manure rainfall simulations/watersheds/P index

Pennsylvania

- 14 full time employees + 6 part time
- Agilent 5900 – just got PO
- Purchased second VarioMax so 3 Elementars
- Compost sample numbers up
- Research – FRST activities
- Biochar trials this fall
- N recs – recalibrate PSNT rates

9:30 am	Discuss Revisions to Methods Manual	B. Hoskins
10:00 am	Regional P Index Discussion	Q. Ketterings
10:15 am	Break	
10:30 am	Salinity assessment with routine soil test	S. Pokhrel
11:00 am	Microbial biomass as possible indicator for yield and manure management? Q. Ketterings	
11:30 am	Summarize goals for 2025	All
12:00 noon	Adjourn	

Future meetings

Year 2025: UConn

Estimated cost of event

- Venue: $500 in the past
- How to cover: Dawn has made the payment of $750 to Grey Towers. Meeting location is secured.
- Suggested to provide online access for those who can't join in person.

Year 2026: West Virgina

New York

- CNAL has officially closed. All Cornell research samples go to Maine.
- Research ongoing:

FRST trials

Forage sorghum (18 trials, 6 trials each of N, P, K)

Value of manure

Nine trials in 2024; Variability in manure analyses; Manure sensors; Incubation; Manure injection; Field balances

DMI/SHI/FFAR Netzero

Field GHG emissions; Incubation study

Whole farm sustainability

Whole farm nutrient mass balance (NMB) now has 20% of NY milk included

Cool Farm Tool (CFT) has GHG footprints for 15% of NY milk

Biodiversity (exploring now with honors thesis and PhD student work)

Water use (to report in the future)

Precision ag

Yield stability zone development for farms

Evaluations (compaction, microbiology, soil fertility, elevation)

Use of data for zone development and yield (drone, satellite)

Single-strip spatial evaluation approach (SSEA) for on-farm research

Rainfall simulations

Manure sources; Rates; Incorporation versus surface application; Residue coverage; Cover crops

New York City Watershed

Manure injection – impact evaluation

NY soil conversion equation project

New initiative for 2025 (Modified Morgan, Mehlich-3 conversions to Cornell Morgan).

NECC-1312 Annual State Report For Rutgers/NJAES Soil Testing Laboratory
Reported October 2024 for period: July 2023 – June 2024

Contact	Stephanie Murphy, Ph.D.
Mailing address	57 US Highway 1 (ASB-II, Cook Campus), New Brunswick, NJ 08901
Phone number	848-932-9295
FAX number	732-932-9295
e-mail address	soiltest@njaes.rutgers.edu
Website address	https://njaes.rutgers.edu/soil-testing-lab/

Lab personnel FTE's: 3.8

Extractant(s): Mehlich-3

pH Buffer: Adams-Evans

Instrumentation: ThermoScientific iCAP Pro ICP Spectrometer,
Elementar vario MAX cube CN analyzer,
Seal Analytical Autoanalyzer,
Seal minilab pH robot,
Bruker S1 Titan pXRF

Cost for routine test: $20

Routine test includes: Soil pH, Adams-Evans buffer pH, P, K, Ca, Mg, S, Cu, Mn, Zn, B, Fe; recommendations for 2 crops/plantings.

Sample Summary:

Category	**Soil**	**SME**	**Compost**	**Plant**	**Water**
Total Samples	7162	75	105	16	3
Source					
Commercial Producer	562	6	8	-	3
Landscape/Garden	3747	53	33	-	
Rutgers Research/Ext/Teaching	1055	16	20	16	-
Engineering	1409	-	44	-	-
Sports Field/Golf Course	223				
Analysis					
Nitrate/PSNT	667	24	72	-	
Cornstalk NO3	-	-	-	-	-
Total N – combustion	360	-	97	16	
Total C – combustion; OM%	2284	-	97	-	-
LOI OM%	490		97	-	-
Solvita CO2	436			-	-
Pb by pXRF	249		-	-	-
Acid-producing minerals	179	-	-	-	-
Texture by hydrometer	1510	-	-	-	-
Sieve Analysis: USDA etc.	388	-	-	-	-

Summary of Soil Testing & Fertility Activities/Accomplishments:

J. Heckman

Research:

1. Nickel Nutrition of Cranberry
2. Nickel Nutrition of Tomato
3. Rock Powder as a Soil Fertility Amendment
4. Soil Test Potassium Calibration Field Trial on Fall Cabbage
5. Pasture Forage Response to Application of Horse Manure
6. Grass Silage Made from Organic Lawn Clippings

Newsletters/Publications

Mineral Nutrition and Plant Disease: https://njaes.rutgers.edu/soil-profile/pdfs/sp-v29.pdf
Renewable Soil Fertility and Non-Commercial Nutrient Sources: https://njaes.rutgers.edu/soil-profile/pdfs/sp-v28.pdf
Nickel Soil Fertility Research: https://njaes.rutgers.edu/soil-profile/pdfs/sp-v27.pdf

S. Murphy

Publications:

RCE FS1359 Soil Health: Purpose and Management, https://njaes.rutgers.edu/fs1359/
Carbon Mitigation Research and Monitoring Program at Duke Farms (final report Kaplan, et al.)

Research/Outreach:

- Carbon Mitigation Research and Monitoring Program at Duke Farms
    - Impact of land-use systems on soil aggregates and associated organic carbon fractions: Analysis of time-variable management systems in New Jersey piedmont soils. (presented at 2023 SWCS Annual Meetings, Des Moines)
- McIntire-Stennis Forestry Grant Proposal: Forestland Conservation Needs Assessment and Program Design (Jason Graboski, PI)
- USDA Climate Hubs' Climate Adaptation and Mitigation Fellowship – serving as "educator" in the Northeast Diversified Ag and Agroforestry program for three Farmer/Advisor pairs of Fellows

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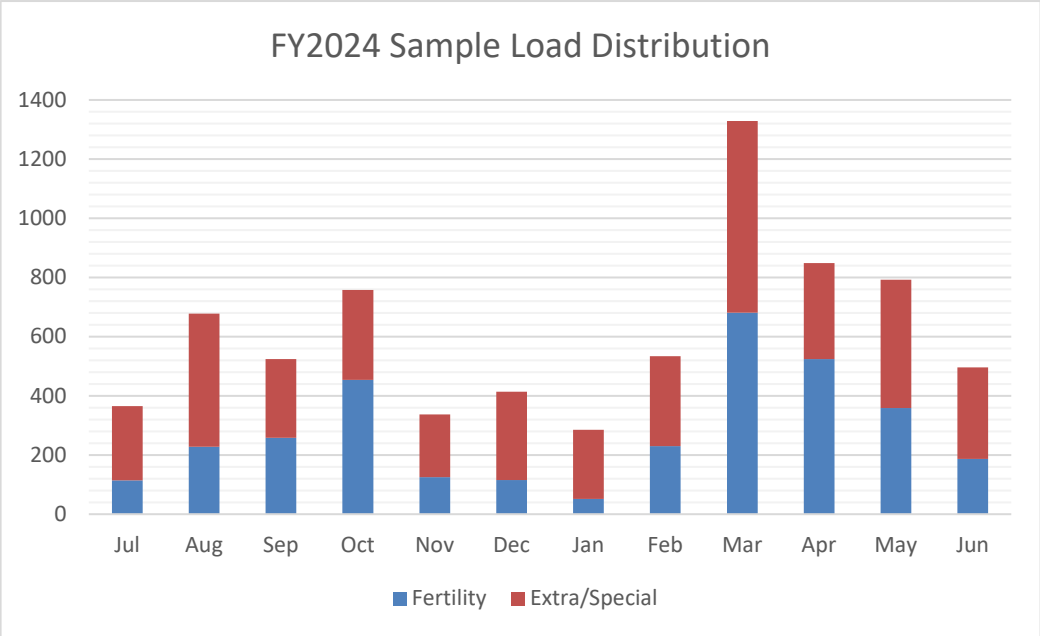
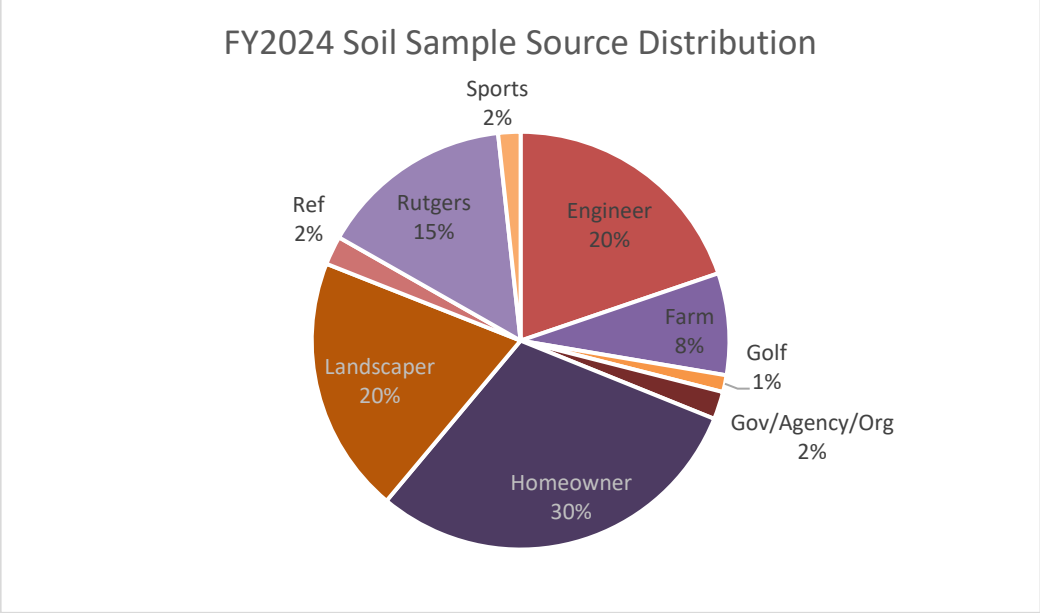
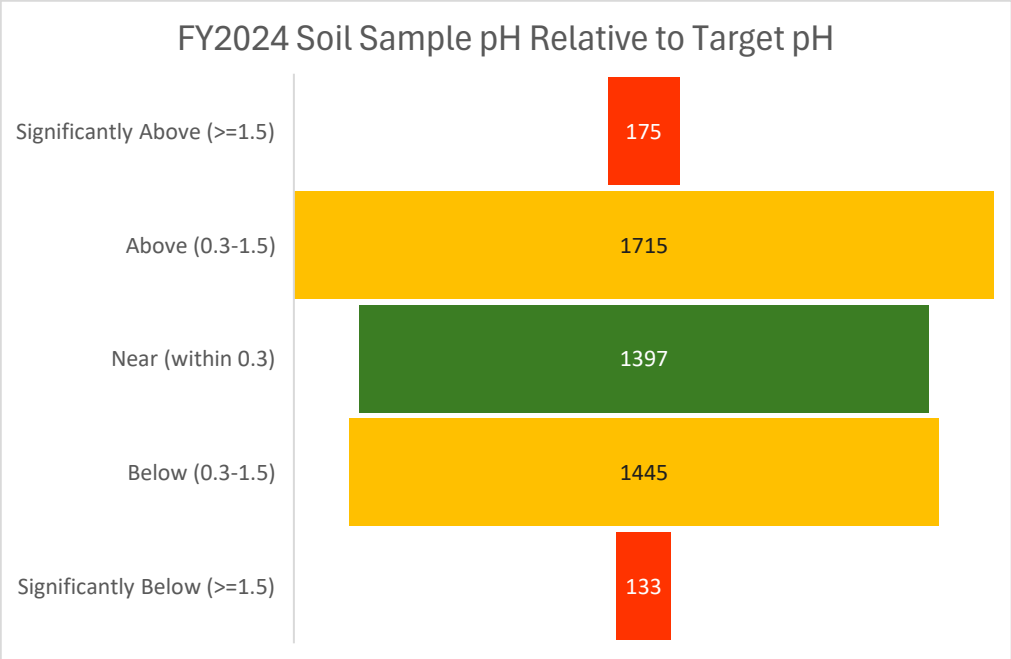
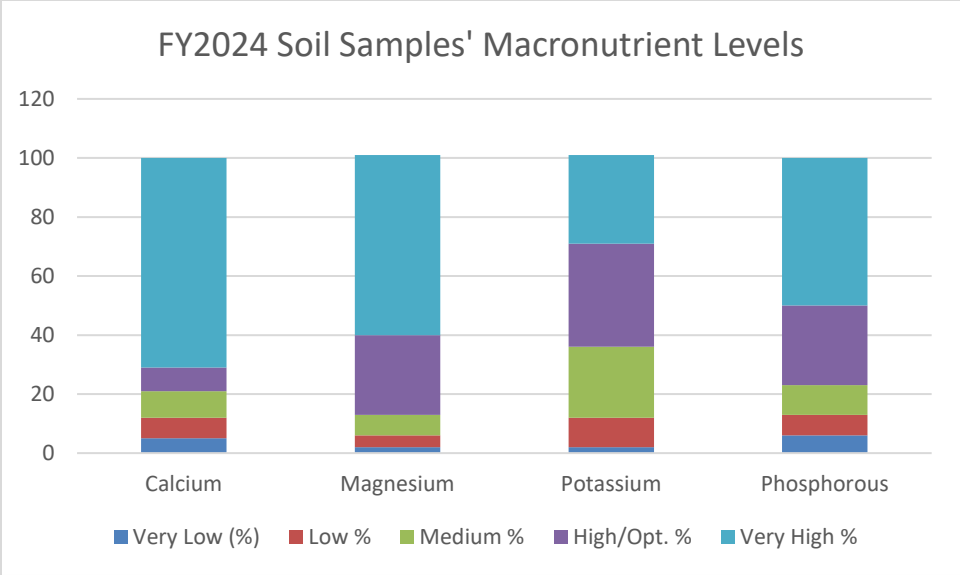
Data/Graphics from FY24 Annual Report:



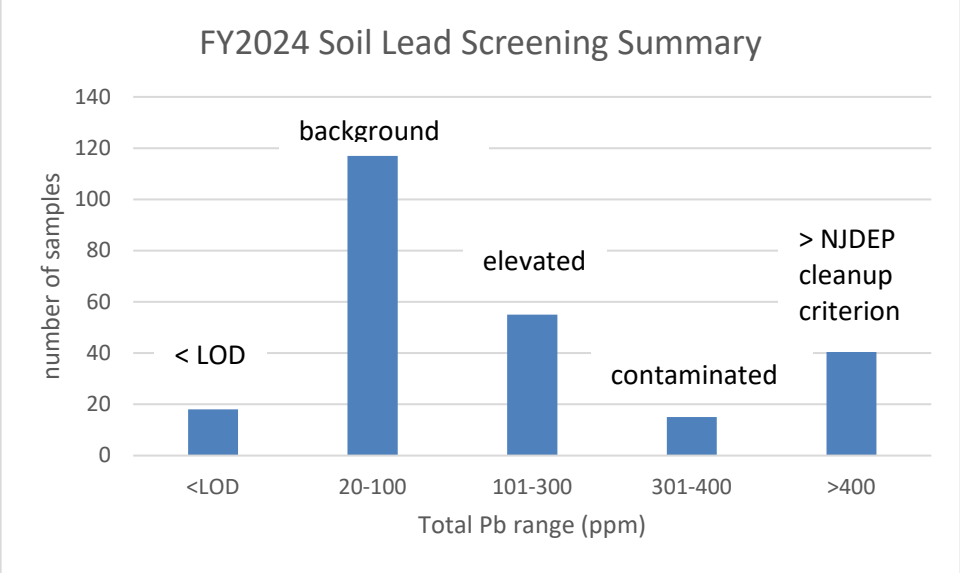
Almost 55% of samples had extra or special tests performed (other than or in addition to standard fertility test)







Samples with at least one element below optimum: 50%



NECC-2312 Annual State Report For ___Massachusetts____
Reported for period: 10/1/23 – 9/30/24

Contact	Sam Corcoran
Mailing address	161 Holdsworth Way, Paige Lab 106, Amherst, MA 01003
Phone number	Sam Cell: 978-855-3242 Lab Phone: (413) 545-2311
FAX number	
e-mail address	sglazecorcor@umass.edu or soiltest@umass.edu
Website address	https://ag.umass.edu/services/soil-plant-nutrient-testing-laboratory

Lab personnel FTE's: 4.75

Manager, bookkeeper, two full time technicians, one 9 month technician

Soil health Extension educator under the lab umbrella, but not on the lab budget

Extractant(s): Modified Morgan

Instrumentation: Lachat FIA (P), Agilent ICP-OES 5800, Spectrum Blue ICP-OES, Elementar CN Vario Max, LabFit pH robot with TPS meter + probes

Cost for routine test: $20

Routine test includes: pH, buffer pH, macro and micro nutrients, lead screening.

Add ons: OM $6; Nitrate $8; Soluble salts $6

Sample Summary: (adjust table as necessary: sample type, source, analyses, and other categories)

Category	**Soil**	**SME**	**Compost**	**Plant**	**Manure**	**Water**
Total Samples	13080	33	-	80	-	-
Source						
Commercial Producer						
Landscape						
Research						
Teaching						
Analysis						
Nitrate/PSNT	14					
Cornstalk NO_3	-					
Total N	80					
Total C and/or OM	80					
Solvita CO2	-					
Particle Size Analysis, Comprehensive	300					
PSA Basic	111					
PSA Title V (sands)	12					
TSM	282					

Summary of Research:

1) State grant (Health Soils Action Plan; HSAP) received to investigate 1. lime applications in till and no-till systems, in combination with organic and synthetic (acidifying) nitrogen fertilizer. Looking at general trends in pH response to lime at two depths, 0-2 and 0-6. 2. Fall cover crops, comparing "on-time" rye to on-time winter killed CC to late planted rye – asks the question "is a late planted rye cover crop better, worse, or equal to winter-kill cover crops". Work began fall 2024.
2) New England Fruit and Berry Growers Association grant received to support CN measurements for NECCC multi-state research project.
3) Additional HSAP funding pending to work on c-seq numbers associated with soil health BPs, work requested by the state
4) Pre-proposal accepted for high OM soil testing and management

Other/News:

-MA legislature considering offering a stipend for farmers to submit samples to the UMass lab
-Bringing back CN and plant nutrient testing this month (October) – debating between acid digestion versus ashing and would be curious to hear what others do/prefer.

NECC-2312 Annual State Report For New Hampshire

Reported for period: July 2023 – June 2024

Contact	Renuka Mathur/Shyloh Favreau
Mailing address	UNH Cooperative Extension Soil Testing Service 34 Sage Way Durham, NH 03824
Phone number	603-862-3200
FAX number	
e-mail address	Soil.testing@unh.edu
Website address	https://extension.unh.edu/agriculture-gardens/pest-disease-growing-tools/soil-testing-services

Lab personnel FTE's: 1 plus 1 student intern. Student works 10 hours per week.

Extractant(s): Mehlich3

Instrumentation: ICP for all nutrients; OM by combustion

Cost for routine test: $16 + OM ($4)

Routine test includes:

Homegardens: Ca, Mg, P, K, pH, BpH, and OM;

Commercial corn, pasture, hay and forage samples: Ca, Mg, K, and P, pH and BpH, calculated CEC, BS and phosphorus saturation

Sample Summary: (adjust table as necessary: sample type, source, analyses, and other categories)

Category	**Soil**	**SME**	**Compost**	**Plant**	**Manure**	**Water**
Total Samples						
Source						
Commercial Producer	546		26			
Landscape	59					
Home Gardens	2106					
Teaching						
Analysis						
Nitrate/PSNT						
Cornstalk NO_3						
Total N	65					
Total C and/or OM	2754					
Solvita CO2						
Other:						

Summary of Research:

1) Participating in FRST Lime Project incubation study. We submitted 12 samples for this study.

2) Biochar study: Investigating the effects of mixing ratios of biochar and composted manure amendments on key soil properties (nutrient levels, organic matter, and soil microbiome) and corn yield in sandy loam soils.
3) Biochar SFN study: Initiated a study to assess the effects of different treatments of biochar and cover crops on the establishment and growth of conifers and hardwood seedlings over a three-year period at NH State Forest Nursery (SFN).

Other/News:

1. Updating our soil test database

NECC-1812 Annual State Report For :Pennsylvania
Reported for period: FY24

Contact	John Spargo	Charlie White
Mailing address	720 Tower Rd. Penn State University University Park, PA 16802	116 ASI Building Penn State University University Park, PA 16802
Phone number	814-865-9155	814-863-1016
FAX number		
e-mail address	jts29@psu.edu	cmw29@psu.edu
Website address	www.aasl.psu.edu	http://extension.psu.edu/plants/nutrient-management

Lab personnel FTE's: 13 (+6 PT)

Extractant(s): Mehlich 3, Modified Mehlich Buffer

Instrumentation: 1 Agilent 5900 and 2 Varion 730-ES ICP; 2 Labfit AS-3010D automated pH analyzers; 2 Elementar VarioMax Cube, 1 Elementar Rapid Max Exceed; 1 Automation Techiques, Inc. 6 channel regent (M3) dispenser, custom-made; 2 Timberline-2800 NH3 analyzer; 1 FIAlyzer-1000 (Cd-reduction, dialysis, NO3)

Cost for routine test: $10

Routine soil fertility test includes pH, BpH, Mehlich 3 P, K, Ca, Mg, S, Cu, Zn

Sample Summary:

Category	Soil	SME/ Greenroof	Compost	Plant	Manure/ Biosolids	Water
Total Samples	54,000	700	1,350	11,000	1,000	3,100

Summary of Research:

1) Modernizing Fertilizer Recommendations: Fertilizer Recommendation Support Tool (FRST). On-going collaborative effort of over 100 individuals represent 41 land-grant, two state universities, and one private university, three divisions of the USDA, and three non-for-profit organizations. FRST is led by Nathan Slaton (UA; SERA 6), Luke Gataboni (NCSU; SERA 6), Matt Yost (USU; WERA 103), Daniel Keiser (UMN; NCERA 13), and John Spargo (PSU; NECC 2312). In FY24, the FRST project hosted twelve virtual working group meetings, presented six papers at professional conferences, published three manuscripts, received funding for three USDA-CIG proposals to support soil test correlation field trials in the Northeast, Northcentral, and Southern regions, and submitted two new USDA-CIG proposals to support research in the North Central and Western regions. We also successfully established a new NIFA National Project, NRSP 11: Building Collaborative Research Networks to Advance the Science of Soil Fertility: Fertilizer Recommendation Support Tool (FRST). Funding from NIFA will support project staff for an additional 2 years, and supplement funding received from NRCS for planning meetings. We have continued to garner support from the private sector. We received funding from OCP and Nutrien to support a research symposium at the ASA-SSSA-CSA meetings in St. Louis, MO. We also successfully negotiated funding from OCP to support

ten field trials in 2023 and 16 field trials in 2024. Finally, we successfully launched the public-facing version of The FRST (v1.0) in March 2024.

2) Remediating gaps in the measurement and management of soil contaminants for Philadelphia urban growers. Research, Extension and Outreach project funded by the Pennsylvania Dept. of Agriculture and initiated in FY22. We collected over 150 samples from over a dozen current or future urban farms and gardens. Samples were analyzed for soil fertility and trace element/heavy metal contaminants using multiple methods. Results were disseminated to cooperators and participants through a series of workshops in 2023. An MS student defended his thesis on part of the project in May 2024. The team has drafted an Urban Soils Management Guide that provides management/mitigation strategies for current or future urban farms and gardens. The Guide is expected to be finalized and published in late fall 2024.
3) Crediting Cover Crops and Soil Organic Matter in Nitrogen Fertilizer Recommendations. Developing and validating algorithms for cover crop and soil organic matter N credits. Testing variations of the algorithm in different cover crop management systems and also using variable rate prescriptions based on sensor derived variations in cover crop N content and soil texture.
4) Mid-infrared FTIR spectroscopy to evaluate soil organic matter chemistry and other parameters. Mid-infrared spectroscopy is being used to asses the prevalence and relative composition of different soil organic matter functional groups and their association with microbial community composition as identified by phospholipid fatty acid analysis. We will also assess the instrument's capability to predict other soil fertility parameters of interest.
5) Updating the Corn Stalk Nitrate Test to evaluate sufficient/excess N. A database of N response trials in corn has recently been compiled in Pennsylvania where the corn stalk nitrate test was conducted. The database will be analyzed from an agronomic and economic perspective to determine if updates to the interpretive ranges need to be made.
6) Evaluating enhanced rock weathering of basalt as an alternative liming agent. Enhanced mineral weathering of silicate rocks has recently been suggested as an effective climate change mitigation strategy to deploy on arable lands. Companies are now offering to pay farmers nearby to a basalt quarry in Blue Ridge Summit, PA $50/ac to receive finely ground basalt. The basalt can act as an alternative liming agent as well as potentially supply some essential nutrients. However, the reaction rate, acid neutralizing capability, and availability of nutrients is not well understood. A two year trial was started in 2023 at the Penn State Agronomy Research farm to evaluate the effects of basalt, limestone, and an untreated control on soil pH, Mehlich 3 nutrients, and crop yields in soybean and corn.

Other/News:

NECC-2312 Annual State Report For: Connecticut
Reported for period: 2023

Contact	Dawn Pettinelli Associate Extension Educator/Lab Manager Patrick McIntosh - Technician
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Website address	www.soiltesting.cahnr.uconn.edu

Lab personnel FTE's: 2 + ½ Special Payroll + students

Extractant(s): Modified Morgan for mineral soils, water for SME soilless media

Instrumentation: Spectro Genesis ICP, Unity Westco Smart Chem 170 Discrete Analyzer for ortho-phosphate and nitrogen-nitrogen, nitrate electrode for tissue NO3-N (Cornstalks), Elementar VarioMax, Timberline TL-2900 for nitrate & ammonium and a Skalar BluVision discrete analyzer

Cost for routine test: $15

Routine test includes: pH, Ca, Mg, K, P, Mn, Cu, Zn, Fe, Al, B, estimated total lead, estimated CEC, % BS & modified Mehlich buffer pH.

Sample Summary: (adjust table as necessary: sample type, source, analyses, and other categories)

Category	**Soil**	**SME**	**Compost**	**Plant**	**Manure**	**Water**
Total Samples	11,374	60	NA	244	NA	NA
Source						
Commercial Producer	1215					
Landscape	6823					
Research	244					
Teaching	229					
Analysis						
Nitrate/PSNT	72					
Cornstalk NO_3				1		
Total N	219					
Total C and/or OM				243		
Solvita CO2						
Other: Tex, OM, SS, pH	2572					

Summary of Research:
1)

Other/News:
Dawn to retire in December.
Master Composter program run in September.
Amelia Magistrali hired as Extension Soil Health person
Some baseline analysis – both MM & SME for some high tunnel/raised bed interpretation/ recommendation SARE grant. Dr. Mia Maltz UConn, Sam Corcoran UMass

Current Research:

1. Validation of Preliminary Environmental Threshold of Modified Morgan Critical Concentration for Phosphorus.
    - Funded by NRCS-CIG-CT
    - Top 10 soil series, 20 sampling locations per soil series. Testing for M3-P, MM-P, ammonium oxalate, and distilled water as extractants for P, Al, Fe, Ca, K. pH, total CN and SOM.
    - Abigayle Ward is the student who is working on it.
    - One interesting finding: Al and Fe alone is unable to explain P-saturation for soils above pH~6.8 in the 0-6" sampling depth range. When calcium is assumed to be primarily responsible for P-sorption in such soils, the model works as expected above pH~6.8. However, we don't have information on the source of Ca, whether it is from historical chicken manure application, continued manure application, liming, or all of above. Investigation into whether lime should be considered in the P-index based on my preliminary findings seems like a practical use of time and resources. And we need more samples and more data.
2. P and K response trials – FRST
    - Funded by NRCS-CIG, as 1 of the 3 regional FRST projects.
    - 1 K trial on corn; 1 K trial on cabbage; 1 P trial on corn; 1 P trial on cabbage.
    - All trials are harvested. Clear visual and yield response observed in cabbage trials.
    - All trials were conducted on UConn Research and Education Farm.
    - Julie Adorno is the student who is working on it.
    - Still waiting for soil samples from the participating states. Please send your samples ASAP. We hired an undergraduate student to assist Julie this semester. Julie will graduate in April 2025.
3. Cover cropping
    - Funded by UConn and SARE Graduate Student Grant
    - Seeding rate and timing for cereal rye and winter pea.
    - Evaluating for biomass, soil microbial properties, feed quality
    - Would like to see if any states are interested in drone seeding into cash crops prior harvest. CT dairy farmers are very much interested and support us to develop a proposal and conduct trials with us. I was thinking a NIFA-FAS or NRCS-OFT (not available this coming FY) or SAS, and any suggestions is appreciated.

      Those of states where drone or aircraft seeding was explored, any lessons learned?
4. Precision Experimentation
    - Funded by NRCS-OFT
    - Conducting large-scale on farm research using variable rate equipment and sensors with farmers in the Pacific Northwest states.
    - Trials mainly focus on N and Cl. The goal is to study spatial and temporal variability of N and Cl response and compare the optimum variable rate or uniform rate under management, topographic, and weather conditions.

NECC-2312 Annual State Report For _____

Reported for period:__2023-2024_____

Contact	*Eugenia Pena-Yewtukhiw (director), Robert Rockis (Senior Technician)*
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Phone number	*304.293.2887 304.293.5375*
FAX number	
e-mail address	*Eugenia.Pena-Yewtukhiw@mail.wvu.edu*
Website address	*https://soiltesting.wvu.edu/*

Lab personnel FTE's: 1 + Special Payroll (2.5 months) + Student Labor

Extractant(s): Mehlich 3

Instrumentation: Instrumentation: Perkin Elmer 2100 ICP, scales, muffle furnace (3 shelves), pH meters. Testing an iCAP 7400 ICP-OES Duo with direct system.

Cost for routine test: The routine soil analysis is at no cost for WV residents

Routine test includes: Ca, Mg, K, P, P saturation (%), water pH 1:1, Mehlich buffer pH

Sample Summary: (adjust table as necessary: sample type, source, analyses, and other categories)

Category	**Soil**	**SME**	**Compost**	**Plant**	**Manure**	**Water**
Total Samples	*7116*	N/A	N/A	N/A	N/A	N/A
Source						
Commercial Producer	*4953*	N/A	N/A	N/A	N/A	N/A
Landscape	*1120*	N/A	N/A	N/A	N/A	N/A
Research	*577*	N/A	N/A	N/A	N/A	N/A
Teaching	40	N/A	N/A	N/A	N/A	N/A
Analysis						
Nitrate/PSNT	N/A	N/A	N/A	N/A	N/A	N/A
Cornstalk NO_3	N/A	N/A	N/A	N/A	N/A	N/A
Total N	N/A	N/A	N/A	N/A	N/A	N/A
Total C and/or OM	N/A	N/A	N/A	N/A	N/A	N/A
Solvita CO2	N/A	N/A	N/A	N/A	N/A	N/A
Other:	N/A	N/A	N/A	N/A	N/A	N/A

Summary of Research:

1) We have two collaborating undergraduate research assistants that are working primarily on a SARE grant related to Soil Health analysis.

Other/News:

Software notes or upgrades:

An in-house (cold fusion based) management data software that works with manual data entry and generates/emails reports is our present data management system. No software upgrades, only maintenance/updates were performed by WVU Extension personnel.

Other notes:

The number of total samples decreased as compared to year 2022-2023. The main decrease occurred in the lab research project samples analyzed. However, the number of private clients' out-of-pocket analyses increased.

The lab was contacted by WV schools, extension agents, and WVU instructors (courses) to provide tours and explain how the soil testing lab functions.

Conservation agencies have contacted the lab to request expedited analyses for late sample submission from farmers participating in cost share programs. We have worked with WVU Extension to fulfill other clients' information requests around the state.

NECC-2312 Annual State Report for Maine
reported October, 2024

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Orono ME 04469

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Web site: umaine.edu/soiltestinglab

Lab personnel FTE's: 4 technical, 2 professional, 1 IT/Administrative

Extractant(s): modified Morgan (ME, VT); Morgan (NY); NH4Cl (forest soils), others on request

Instrumentation: TJA iCAP-6300 ICP, Spectro Genesis ICP (2019), 2-OI FS-3700 Flow Analyzers, Labfit pH system, Leco Tru-Mac & 928 combustion analyzers, AIM600 Kjeldahl block digestor Dionex ICS-1000 Ion chromatagraph, CEM MARS-6 microwave system, PE FIMS-100 Hg analyzer

Cost for routine test (2023): $20 ($15 volume or winter discount), $25 with NH4/NO3 (Comprehensive test)
Routine test includes: pH,LR(Mehlich), OM, P, K, Mg, Ca, S, B, Cu, Fe, Mn, Zn; Na, (Cd,Cr,Ni,Pb) screen

Sample Number Summary (for calendar 2023)

	ME+VT+NY Soil	Plant	ME+VT Manure	Compost	Metals	Other	Prepped for instrument
Commercial	12175	475	300	265	325	40	700 ICP
Homeowner	5730				(TSM+3051)	(lime/fert)	2160 TN/TC
Research	625	360					250 NH4/NO3
NO3/PSNT	2585						
Other	265 M3						

635 HT/210GH
815 Solvita
125 Soil Health
360 Forest soil
310 PFAS study soils

Summary of Research (2023/2024)

PFAS a major research focus in Maine: Extension,Chem Eng, MEDEP, MDACF, MECDC, FDA, EPA
Chem Engineering Dept creating on-campus PFAS analysis facility
Biochar a major research focus for several PI's (moisture retention, soil health, PFAS remediation)
Cover cropping/crop rotation effects on soil health and C sequestration
Project to survey growers using deep compost mulch no-till: documenting nutrient stratification, soil health
Multi-state study on high tunnel soil fumigation: bed steaming and anaerobic soil disinfestation

News/Other (2023/2024)

$5M earmark approved: $3M for renovations (2 - 3 years), $2M for equipment upgrades
Desperate need for more space and additional FTE's
Upgrading equipment: combustion analysis, flow injection analysis, microwave digestion

New Soils faculty hire - Allison King: teaching, soil carbon/soil health research

Small drop in sample numbers, after price increase.
Increased requests for add-on analysis (NO3, Part. Size), regardless of cost
High demand for combustion analysis (biochar, PFAS, compost, soil health samples)
Continued ban on all biosolids/biosolids compost applications in Maine
Dean is emphasizing increased lab capabilities to support new and on-going research