MASE Newsletter

Maine Association of Site Evaluators

February, 2024

MASE Annual Meeting & Technical Seminar

February 27, 2024
Jeff's Catering, Brewer

It's an old adage that if you still have half your wood and half your hay on Groundhog Day, you will make it through the long winter of heating and feeding the animals. Jeff's Catering in Brewer has confirmed that they still have plenty of wood and hay and are set for this year's MASE annual meeting on February 27. This is an opportunity for MASE members to escape the winter doldrums and drive long distances through the challenging winter road conditions to attend what can only be anticipated as one of the best annual meetings ever! This year, in addition to the usual complex technical discussions, vendor displays, organization finance reports, and philosophising about the merits of good soil versus bad dirt, we are offering a special presentation on the history of the modern Subsurface Wastewater Disposal Rules and the birth of MASE as an organization. Rumor has it that some of the original members of the Subsurface Wastewater community will be on hand to tell this remarkable story.

Maine was one of the earliest states to adopt the site evaluation system for designing septic systems, and it was the bold vision and courage of a handful of people working at the Division of Health Engineering that we can thank for creating the Site Evaluator profession. The 1974 edition of the "State of Maine Plumbing Code, Part II" contained 60 pages and contained design procedures to design stone trenches, beds, and concrete chambers. A typical fee for a site evaluation was $75 and the permit cost $25. It was not uncommon to find full septic systems installed for around $1,000.

MASE was conceived by this same group of visionaries and was a hit from day one. The organization gave site evaluators a chance to connect with their peers in what can sometimes be a lonely profession.

This newsletter contains the complete article on the history of the Subsurface Rules, as well as other timely articles written by some of out most esteemed members. Enjoy the articles and we hope to see you at the annual meeting!

Early MASE Meeting

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Message From
MASE President Joe Stevenson

Greetings MASE Members in 2024!

It's hard to believe 2023 is already in the books – hopefully another incredibly busy year for all of you. For my first year replacing Glenn Angell as board president, here are a few highlights of what we have been working on:

- We held the annual meeting last February at Jeff's Catering in Brewer during an intense snowstorm. Thank you to those of you who ventured out. The meeting was informative as always, with technical information ranging from pump stations to bourgeois privy designs. The soil analysis samples were a hit, prompting much discussion.
- We re-started the Technical Review Committee to address proposed rule changes and to ensure membership has unified representation to comment and response periods. Thank you to Natalie Curry, Tim Hodgins, John Gomez, Brady Frick, Rod Kelshaw, and Amy Jones for volunteering to serve on this committee. They provided great feedback on a few proposed rule changes.
- MASE members assisted with the licensing exams again this year, offering opinions on open pit results. I'm appreciative of any volunteers who participate and cannot emphasize how important it is for us to maintain a robust working relationship with the Subsurface Wastewater Team at DHHS.
- The annual MASE golf tournament was again held at The Meadows in Litchfield. Turnout was good and competition fierce as always!
- The Fall Field Day fell within the same week as the MAPPS/MAWS field day this year. We recognize it is a challenge for many of our MASE members to take consecutive days off in one week to collect CEU's for multiple disciplines. We are working more closely with MAPPS and MAWS to collaborate in the future, aiming to benefit all groups.
- Lastly, we continue to evolve from the necessary pivots made during the Pandemic years. MASE, like many other professional organizations finds itself evaluating returning to previous practices while embracing some of the changes made. We are working to find ways to efficiently present video of the annual meeting presentations for those unable to be physically present, while striving to offer high quality in-person training opportunities. We are also analyzing the organization's expenses to become more financially lean going into the future.

A massive thank you is owed to Dale Knapp who continues to serve a crucial role as Executive Director. Same for Glenn Angell for his continued guidance in his role as "Past President" as well as Natalie Curry serving as Treasurer, Richard Green serving as Secretary, Tim Hodgins serving as Vice President, and board members Hope Hampton, John Gomez, and Dave Struder. As always we are looking for future board members to help contribute!

We have a great line up for the annual meeting this year, hearing about the history of our profession as well as from some of our founding members (special thanks to Albert Frick). This will be coupled with some presentations on technological advances and review of backfill samples. I'm looking forward to seeing many familiar faces!

Lastly, thank you all for the opportunity to serve a term as Board President. I feel the pride of our profession each time I interact with all of you and am honored to help guide this organization into the future!

Respectfully,
Joe Stevenson
President MASE

MASE 2023 TREASURER'S REPORT

by Natalie Curry, MASE Treasurer

It's definitely hard to believe that another year has passed since the last treasurer's report. MASE was able to have their three annual events this year consisting of the annual meeting, golf tournament, and fall field day. The general summary is MASE funds have been decreasing since the beginning of the pandemic but MASE is still holding steady. Please refer to the attached MASE 2023 Financial Report for the details.

"Having audited your accounts, we can't find anything at all suspicious. Which makes us very suspicious."

This year we are in the process of moving over to Quickbooks online accounting software for bookkeeping. Our primary bank account is still the Key Bank checking account and we also continue to use PayPal for our online transactions. I have to still sort through the ins and outs of Quickbooks (running into some categorization issues) but hope to sort through this in the upcoming months to be able to create a financial report through Quickbooks for future years.

Overview: MASE started out with assets of $18,867.83 and ended the year at $16,784.29, a decrease of $2,083.54. This decrease is due to an increase in website expenses and timing of some year-end payments. The board is going to discuss how we can reduce future website expenses.

Income and Expenses: Income was $13,416.36 up from $2,490.00 in 2022 (income was down in 2022 due to no annual meeting or outside donations, and low membership dues). Expenses were $15,499.90, up from last year's expenses of $10,158.62. This difference is partially due to the timing of some year-end payments.
Dale Knapp continues as Executive Director (and still doing an excellent job I might add). The ED contract is $400/month. Expenses for 2023 were $4,800.

The annual summer MASE golf tournament was held again at the Meadows in Litchfield. Revenue was $1,086.51 and expenses were $1,176.00. A special thanks to Kathy-Rae Emmi at Septic Systems of Maine for your continued support and providing lunch!

The annual MASE field day in September was held in tandem with the Site Evaluator exam. We had a great turnout again this year and great weather. Revenues from the event were $2,113.75. Expenses were $2,110.46. A big thanks to the site evaluators that were pit judges, they did a great job and the exam week was successful. This year MASE donated $1000.00 to Envirothon. Also this year MASE received a $3,000.00 donation from Construction Consultants Inc., thanks Wayne!

The Board is looking for ideas to improve the website and reduce management costs. Also still looking to enhance education and promote our organization. Please let the MASE board know if you have any ideas. As always, the Board needs membership involvement and support to make this organization run. Your time and help would be greatly appreciated. Thanks very much for the opportunity to serve as your treasurer, and best wishes for a prosperous 2024!

Respectfully Submitted,
Natalie M. Curry, Treasurer

MASE 2023 Financial Report			
Total Starting Assets	**$18,867.83**		
	Income		
	Annual Meeting Program Fees	$3,465.91	
	Annual Meeting Vendor Fees	$1,400.33	
	Donation from Construction Consultants Inc.	$3,000.00	
	Golf Tournament Fee	$1,086.51	
	Field Day Workshop Program Fee	$2,113.75	
	Membership Dues	$2,349.86	
	Total Income	**$13,416.36**	
	Expenses		
	Annual Meeting Expenses	$3,095.06	
	Golf Tournament Expenses	$1,176.00	
	Field Day Expenses	$2,110.46	
	Executive Director	$4,800.00	
	Donation to Envirothon	$1,000.00	
	Website Expenses	$2,568.03	
	Office Misc. Expenses (i.e. Quickbooks)	$290.00	
	Insurance	$324.00	
	PayPal fees	$96.35	
	Total Expenses	**$15,499.90**	
	Petty cash on hand	$40.00	
End of Year Assets	**$16,784.29**		

REMINDER TO MASE MEMBERS!

Years ago the MASE Board arranged a 10% MASE discount with Forestry Suppliers. As we gear up for another field season, the timing is right to take advantage of this. All we have to do is enter our MASE Group Code 372 into the promo code when we place our orders.

28th Annual MASE Golf Tournament Results

By Dave Kamila

MASE held our 28th Annual Golf Tournament on June 16th at The Meadows Golf Course in Lichfield. Things were different this year because the golf course is now under new ownership and they require a minimum of 50 players to be an official tournament with closest to the pin and long drive winners. We had 21 players, whch is more typical for us in recent years. I can't recall us ever having at least 50 players in any previous years. In any case we were able to play our usual scramble format and had a group lunch afterwards. The winning team this year included your's truly along with Dave Moyse, Andy Pierce and Mark Hampton with a total score of 65. Second place honors went to Roman D'Salva, Mike Bounaitis and Kathy Emmi with a score of 66. Despite no Long Drive or Closest To The Pin awards everyone had a good time. Looking to the future it is up to the membership to decide if we want to continue on this basis or look elsewhere for another venue.

Executive Director Report

2023 was a productive year for the Maine Association of Site Evaluators, and it was wonderful to be able to return to offering the membership a full complement of in person events. We have seen several new members join the organization and it has been exciting to see new volunteers serving on the Executive Board of the organization. Joe stepping in to serve as MASE President has been great and he is doing a wonderful job in leading the group. He shares the position with some great past presidents, even Glenn. We have also seen more future professionals sitting for the exam, and that is nice to see. It seems wild, but I believe this might be my 20th year of serving the organization in some capacity, and somehow, I still enjoy it. I could be off by a year or two, my memory is now subject to the reality that I have fully transitioned out of being a "young professional". We have transitioned to using Zoom more in Board meetings and that seems to have increased attendance to more than just Glenn, Brent, and myself as a few meetings in years past. We updated our email distribution list after the last annual meeting and are now using Mailchimp to send membership updates and invited. I hope this has helped to address the issue of messages being missed. Make sure you enter your email in the "Subscribe" link at the bottom of the MASE home page. If you are not getting our messages, send us an email and we can help make sure you are on the list maseexecutivedirector@gmail.com If you have questions, suggestions, or contributions all are welcome. We look forward to another very active and successful year in 2024.

Respectfully,
Dale F. Knapp

MAINE ASSOCIATION OF SITE EVALUATORS

2024 Membership Form & Annual Meeting Registration

MASE NEEDS MEMBERS LIKE YOU!

Your membership and participation are important, and our budget depends on your dues! All MASE memberships expire in February. You can join now and be assured of another year of representation of your interests by MASE. We are working to keep license fees down, regulations reasonable, host quality field seminars, organize the annual meeting & get our members CEU's!

(Please complete a separate form for each individual)

☐ **Regular Membership** (Maine Licensed Site Evaluator) $25

or

☐ **Associate Membership** $15
(Unlicensed individuals with an interest in the goals and purpose of the Association)

☐ **Annual Meeting – February 27, 2024** Member: $30
(includes lunch) Assoc: $35
Non-member: $45

** Please Register by February 23rd to reserve a meal.*

Make Checks Payable to: ***MASE***

Mail To: Natalie Curry, Treasurer
74 Higgins Road
Searsmont, ME 04973

Total Enclosed: _____

Name: _____ License Number: _____

Company: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Telephone:_____ E-mail: _____

www.mainese.com **info@mainese.com**

43rd MASE Annual Meeting

February 27, 2024
Jeff's Catering
15 Littlefield Rd, Brewer, ME 04412

7:00 - 7:30 - Vendor Setup

7:30 - 8:30 - Registration - Meet with Vendors

8:30 - 8:45 - Opening - President Joe Stevenson & Brent Lawson, State Site Evaluator

8:45 - 9:45 – Alex Pugh & Brent Lawson - Subsurface Program Updates

9:45 - 10:15 - **VENDOR BREAK**

10:15 - 12:00 - The Founding Fathers of MASE – Don Hoxie, Clough Toppan, Ken Stratton & Eugene Moreau

12:00 - 1:30 - **LUNCH & VENDOR BREAK**

1:30 - 2:00 – Soil Sample Testing & Lab Results Presentation – Dave Marceau

2:00 – 2:45 – Alternative Tools and Processes for System Design and Data Collection – John Gomez

2:45 - 3:45 – The History of Wastewater – Jim King, Eljen

3:45 - 4:15 Business Meeting

- 2023 Meeting Minutes
- Treasurer's Report
- Executive Directors Report
- Donation Request - Envirothon
- Election of Officers

4:15 - **ADJOURN**

MASE Annual Meeting Minutes
February 28, 2023
Jeff's Catering
Brewer, ME

Minutes of 2023 Business Meeting, 3:30 pm:

Glenn Angell, 2022 President, Presided over the meeting.
This was the first in person meeting held since 2020.

Door Prizes
The door prizes were particularly good this year.

2020 Annual Meeting Minutes
The 2020 meeting was held via ZOOM. The minutes were not available at the 2023 meeting but are attached to this document.

Treasurer's Report
Natalie Curry presented the Treasurer's report. **Moved and seconded, approved**.

Executive Director's Report
The report was present by Dale Knapp, Executive Director. There will be a new webmaster and Listserv to try to better distribute the MASE information and announcements. The golf tournament was successful.

New Business – Donation Request
1. It was moved and seconded to donate $1,000 to the Envirothon. **Approved**.

2. Special Request to do something on behalf of Ken Stratton's son. The general consensus was yes the membership would like to do something. There was discussion of ongoing training. The board will pursue this during the year.

Election of Officers

The slate of officers was presented:

Glenn Angell, Ex-President
Joe Stevenson, President
Tim Hodgins – Vice President
Natalie Marceau, Treasurer
Richard Green, Secretary
Dave Studer, Director
John Gomez, Director
Hope Hampton, Director
.
Moved and Seconded, approved.
Meeting was adjourned at 4:00 pm.

Respectfully Submitted,
Richard Green, Secretary

MASE Annual Meeting Minutes
February 23, 2021
ZOOM Meeting

Minutes of 2021 Business Meeting, 8:00 am:

Glenn Angell, 2020 President, presided over the meeting, assisted by Dale Knapp.

No voting was done because it was a virtual meeting. Glenn will send out survey monkey to vote on items as needed.

Executive Secretary Report

No items reported.

2020 Treasurer's Report

Natalie Marceau, Treasurer provided the report and noted that there was an increase of $4,000 in net funds for the year. Finances are in line with previous years and are strong.

New Business

Envirothon

It was proposed to donate $1,000 to Envirothon. Glenn will send out survey monkey for voting. No discussion.

Election of Officers

Matt Page, Vice President, announced that Ed Green agreed to join the board. The actual final slate of officers will be sent out by Glenn in survey monkey. Natalie will continue as treasurer, Glenn and Matt will continue as President and VP. Dave Moyse and Joe Stevenson agreed to continue. Richard Green agreed to continue as secretary.

Meeting was adjourned at 8:45. It was attended remotely by approximately 85 people, but may have been low because of some difficulties logging in.

The business meeting was followed by seven remote speakers who presented some very interesting topics. Brent updated the status of rulemaking. Attendance was 136 during the pm.

Respectfully Submitted,
Richard Green, Secretary

HISTORY OF MAINE'S ONSITE WASTEWATER DISPOSAL REGULATIONS

The transformation from the soil percolation test method to the site evaluation method for designing septic systems and the establishment of the MAINE ASSOCIATION OF SITE EVALUATORS (MASE)

October 19, 2023

Albert Frick, S.E, C.S.S, [DHE State Site Evaluator (1978-1985)]
Don Hoxie, P.E., [Director of DHE (1973-1994)]
Ken Stratton, S.E., C.S.S., State Soil Scientist, [Maine Soil & Water Conservation Service (1971-1975)], Land Use Regulation Commission (1975-1978]
Clough Toppan, P.E., S.E.,[Program Manager Wastewater and Plumbing Control DHE (1971-1995 of DHE]
Eugene Moreau, P.E. [Program Manager Wastewater & Plumbing Control DHE (1975-1995)]

It is coming up on 50 years since the State of Maine replaced the percolation test with the Site Evaluation Method for septic system design. The Maine Site Evaluators that were practicing during that time are retiring and new/younger Site Evaluators are currently practicing. Many of the new folks may be interested in knowing the early history that created their profession in Maine. Don Hoxie, Clough Toppan, Eugene Moreau, and Ken Stratton were key players in this matter and explained what transpired, and why it happened, and were extremely helpful in providing the details and background for writing this article.

Early Maine Septic System Code

Ken Stratton, who was a Professor of Soil Science at Delaware Valley College, took a position as Maine State Soil Scientist in the Maine Soil & Water Conservation Service (MSWCS) in 1971. Charles Boothby was the Executive Director at that time. Stratton stated that "*One of the major tasks of this position was to accelerate the implementation of soil science in Maine land use regulation. Charles Boothbay and I (Stratton) worked with other State agencies to have requirements for soil science information integrated into their permitting requirements. Maine was experiencing a lot of development activity at the time, and, because the MSWCS was a review agency for development projects, we were seeing many problems developing, especially failing septic systems in subdivisions. Boothby directed me to work with DHE, DEP and LURC rather than to be out mapping soils."*

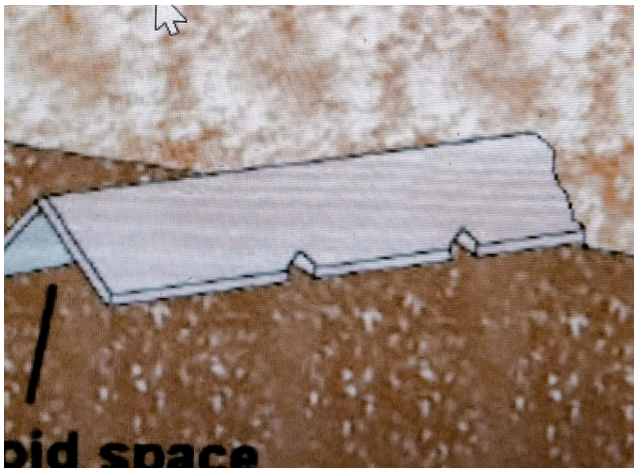
Ken Stratton in 1972 met with Earle Tibbitts who was then Director of Health Engineering [Currently the Division of Environmental Health (DEH)]. *" I went to see Earle about the need to incorporate soils information into the plumbing code. Earle was ready for retirement and didn't want to face a major revision to plumbing code requirements. His (Tibbitts) only comment to me was 'Distance Lends Enchantment'. I never knew what that meant - still don't"* Stratton explained.

Don Hoxie (P.E.), who had worked for the Director of the Division of Health Engineering (DHE) from 1959 to 1994 became the Director in 1973. Ken Stratton returned to revisit the topic "*and found Hoxie very receptive to the idea of incorporating soils information into the plumbing code*".

It was during Hoxie's tenure that the Maine Subsurface Wastewater Rules experienced the most transformation and progress. Don Hoxie reflecting upon the status of Maine's '*Plumbing Rules'* when he became supervisor of the Department, he stated that "*percolation test requirements recognizing modern plumbing fixtures and the*

number of bedrooms was adopted in the early 1960s. Prior to that on-site wastewater disposal was regulated by a single paragraph in the Maine State Plumbing Code. It allowed either disposal trenches or cesspools. It assumed that the only wastewater generated came from water closets, bathroom lavatories, and kitchen sinks. As with the percolation tests, the code did not consider the presence of a high ground water table so many systems were placed directly into the ground water table. Interestingly, the pre-1960 Plumbing Code required only one trench consisting of inverted wooden blank troughs and the length of the leaching field was determined by whether the site was sand, loam, or clay. " (See Figure 1). The early Plumbing Code was silent on many relevant topics and lacked specificity for sound regulations was Hoxie's opinion at that time. Gene Moreau also added that the pre 1974 Code "*didn't address the existence of a restrictive layer, and near-by circumstances ."*

Figure 1. Early *Vee Notch* Leaching Trench



Vee Notch Plank Trenches were constructed by nailing wooden planks together at a 45-degree angle, usually using rough cut 2 " thick by 12 " wide Hemlock planks. Notches were cut at regular intervals into the bottom edge of the planks to allow effluent to flow into soil along the sides, leading to the name of 'Vee Notch" Trench

Photo 1. Early*Vee Notch* Leaching Trench Under Construction

Clough Toppan (P.E.), who assisted Hoxie during this time stated that "*the percolation tests were found to be unreliable and, in many cases, not being done properly, or worse yet, not being done at all during that time period.* Gene Moreau suggested that *"there were numerous septic malfunctions; I believe the life expectancy*

during the pre-1970 years was about five years or less".

Percolation tests are very laborious to perform in a correct manner since testing required having a large volume of water available to pre-soak the test holes and also enough water on hand to fill each hole to measure the apparent percolation rates. Percolation tests required auguring equipment, water wagon and a quite lengthy elapse time to accurately measure the water level drop per each test large dia. auger boring (U.S. Public Health 1945 Manual of Septic Tank Practices). [Many studies to date cite limitations and problems with the use of percolation tests for disposal system design (U.S. Environmental Protection Agency, 1978)]. Maine DHE reviewed its siting and design criteria because the use of percolation tests was found to be unreliable and areas with unsuitable soils were being developed (Toppan, 1976), (White, Davis, 1979). Maine decided to discontinue using the percolation test because of concerns about the increasing potential for escalation of health hazards, nuisances, and environmental degradation.

In the early 1970's, Maine's Department of Human Services, Division of Health Engineering used the *Manual of Septic-Tank Practice (U.S. Public Health Service, 1967)* to site and design disposal systems (like most other states).

Transition from Percolation Method to Site Evaluation Method

Don Hoxie was the visionary and served as the 'catalyst' for improving the entire Subsurface Wastewater Disposal Rules. Stratton claims: "*as far as I am concerned the real hero in all of this story is Don Hoxie; he not only saw the need to change the SSWD program but had the courage to do it!*"

The team of Hoxie, Toppan, and Moreau (group of professional engineers in DHE) began to go to work to revamp the inadequate SWD Rules at the time and to implement the new available science to create a more comprehensive, science-based system for better SWD designs for improved better public health and environmental sanitation.

Consequently, in early 1970's the Maine's Subsurface Wastewater Disposal Rules were being modified to incorporate a site evaluation concept to replace the percolation test, and new design criteria to overcome Maine's severe soil limitations. The site evaluation concept is based on soil morphology to appraise the expected hydraulic loading rates without the requirement for conducting percolation tests. The absorption area design, size**,** and vertical separation distance to the limiting factor (i.e., bedrock, impervious layer, ground water table) is also determined by the soil evaluation (Frick et al**.** 1983), (Black and Struchtemeyer, 1982).

Don Hoxie was impressed by research done in the early 1970's by Rein Laak (Laak et. al. 1974); he said that "*Laak identified the existence of an organic mat found on the bottom and sides of leachfield from a build-up of living and dead anaerobic bacteria and polysaccharides called a '**biomat'**. The study suggested that an excessive organic mat build up was responsible for many early system failures. So, I* [Hoxie] *recognized the existence of the biomat phenomena, and I incorporated and adjusted the absorption area sizing making provision for the reduced acceptance rates (LTAR). The data came from a study conducted by Laak at the University of Connecticut. There in a barn maintained at ground temperatures, he daily loaded several glass columns, containing different soil textures, with campus wastewater and recorded the daily acceptance rate of the biomats as they developed over time. It was from this data that made it possible for DHE to correlate his long-term biomat acceptance rates (gallons/day/sq. ft.) with the proposed established soil profiles."*

This was a very bold regulatory step for Maine, since Maine was one of the first three states in the USA to adopt this approach at the time. To make Maine's Site Evaluation concept work successful, Don Hoxie, with Clough Toppan's help, needed to apply the correct long term acceptance rates (LTAR) that were measured in a lab using soil columns to Maine's specific soil types. Don Hoxie said "*he sought out the expertise of the University of Maine Soil Science Department, the Soil Conservation Service (now NRCS) and the State Soil*

Scientist (Stratton)" to refine that piece of the regulatory concept. Subsequently, Soil Scientists (Ken Stratton, Dr. Roland Struchtemeyer, Robert Rourke, John Ferwerda, and Ken Laflamme) assisted in coordinating the extensive soil hydrologic rates measured by the *U.S. Soil Conservation Service* (aka today's *Natural Resources Conservation Services*). Robert Rourke, a Soil Scientist at the University of Maine was doing extensive soil laboratory research on capturing and/ or recreating soil columns in the laboratory and determining the hydraulic conductivity for Maine soil types (series: e.g., *Adams, Buxton, Skerry)*

The new site evaluation design approach, not only had to properly size the proposed absorption fields for various types of Maine soils, but also had to make provisions to elevate the bottom of the absorption fields a sufficient distance above the high ground water table. This was a new concept because the customary septic system installation practice, prior to this point, was to construct the septic systems in the original soil. Accordingly, the new 1974 Rules required raised disposal areas with moderately drained soils. The natural soil phenomenon of ground water tables exhibiting '*mottles'* was a new concept. Practicing Site Evaluators coming from engineering, geology or plumbing backgrounds were subjected to training sessions to learn how to properly identify soil mottling characteristics and other pedological (i.e., soil forming) characteristics. Ken Stratton was active in training during this period.

Don Hoxie and Clough Toppan, with the guidance of Ken Stratton and UMO and SCS soil science information set up a table/chart using Maine soil characteristics of the parent material, texture, and drainage type that originally appeared as 'Table 9-1' in the 1974 Code/Rules and currently is 'Table 5D' in the Code/Rules. This table has been the guiding chart for sizing septic systems in Maine for over 50 years.

DHE has monitored the relative performance of septic systems and failure rates of the various soil groupings and made minor adjustments as needed over time. However, there have been relatively minimal and small adjustments from the very first design concept. The area of most change was with Profiles 5 and 6 (i.e., Fine sand to coarse sand and gravel). Don Hoxie explains: "*Shortly after the code went into effect it was found that the square footage per day for each gallon of wastewater needed to be increased for sandy texted soils. Wastewater passage through the biomat was assumed to be the result of hydrologic head pressure plus the capillary pull of the underlying soil. Thus, it was felt that the lack of significant capillary action in sand was the culprit."* Gene Moreau commented that "*that this fine sand did not have sufficient capillary action and thus created a very thick bio-mat which acted like a sheet of plastic to restrict water transfer to the soil".*

Obviously, the innovative approach required a massive re-writing of the regulations governing septic system design. Don Hoxie tasked Clough Toppan with a massive re-writing of the Code to incorporate into regulations of the Site Evaluation Methodology and the proposed new more comprehensive SWD Rules. Clough Toppan said that "*Don Hoxie gave me as my very first professional task to write the proposed new Plumbing Code that was ultimately adopted in 1974.*

Note that the 1974 Code basically served as the template for the septic design component of the later codes and the code used currently. The code Toppan wrote in 1974 is basically the septic design component of the current Code but lacking all the land use regulation control mechanisms that were later woven into the SSWD Rules over the years (e.g. Seasonal Conversion Control, One Time Exempted Expansion, Shoreland Zoning higher criteria, New System Variance.)

Several years after the 1974 code was adopted, questions arose concerning the scope of professional authority/ expertise/limitations. The big question at that time was: Who can do what? This matter had to be worked out by agreement concerning Professional Engineers, Soil Scientists and Geologists. A couple examples were: Are all professional engineers (chemical, mechanical, electrical, etc.) qualified to evaluate soil profiles, or are all soil scientists or all geologists qualified to design large wastewater systems.

Eugene Moreau of DHE worked with the licensing boards and professionals (i.e., Professional Engineers, Geologists and Soil Scientists) and the legislature to get the original site evaluator licensing legislation passed. He also was successful in getting the Maine Site Evaluator's Certification Rules and the revised Maine SSWD Rules incorporating the site evaluation methodology approved by the Rule Making Procedure.

Moreau states that "*he initially became the legislative liaison for the Plumbing Control Program but eventually he became the liaison for the DHE.* We emphasized that the new statues and rules were based on extensive research and input from the Boards of the Professional Engineers and the Geologist/Soil Scientist.

During this same period, Ken Stratton explained that *"(he) went to the Legislature's Office of Policy and Legislation Development and got advice from Hellen Ginder about writing a licensing requirement for Soil Scientists.* Stratton stated that *"I wrote the first Soil Scientist Certification law and got Representative John Martin (who had just been elected Speaker of the House) to sponsor the bill. That bill got incorporated with a similar bill that geologists had put together. It passed in 1977, over the objection of many engineers."*

Although the skillset and ability needed to do percolation test versus site evaluation are quite different; the State of Maine was on the verge of abandoning the percolation test and completely replacing it with the site evaluation method. To meet the supply and demand of the needs of the septic system design industry at that time, and to provide some continuity, the Division of Health Engineering allowed a provision that experienced professionals who were doing the percolation testing would be eligible to be '*grandfathered in*' provided they had adequate education and/or experience. This allowance was available for a brief time until DHE could conduct enough field tests to relicense the professionals under the auspices of the new Site Evaluator Rules and Regulations. Ken Stratton was active during this time, training potential site evaluators with one-on-one field training and conducting field seminars. Gene Moreau with the assistance of Ken Stratton and S.C.S. soil scientists were called upon to administer many *field* and *written* tests in the following years to license Site Evaluators to practice under the newly adopted regulations.

Gene Moreau who was working under Don Hoxie to implement the new Code advised "*bear in mind that the new legislation required that every municipality in Maine was required to have a Local Plumbing Inspector (LPI). The overall LPI was lacking in both quantity and quality. Many of the LPI's were 'good old boys' back then who rarely inspected any septic systems. It seemed that excavating contractors would install a disposal system of their liking (e.g., trench) and it would rarely be inspected by the LPI. In fact, many towns did not have an LPI at that time".* To implement the Plumbing Code during the transition, the State Plumbing Inspector Kerwin Keller and Moreau put on many training seminars throughout the State during that time and worked to get LPI's appointed in Maine towns.

Subsequently, many training of septic system installer contractors also followed for many years thereafter, conducted by Albert Frick and David Rocque, to emphasize the new requirements of proper fill material and construction techniques.

DHE during 1975 combined the Local Plumbing Inspector program, the Plumbing Control program, and the Subsurface Wastewater Disposal program into one unit which was instrumental to making the new soil evaluation program work more effectively.

A side note on technological advancement relating to the implementation of the New Rules is that DHE was one of the earliest users of computers in the State of Maine Government. Hoxie reports " we did use IBM PCs very early on to issue licenses and to track the issuance of plumbing and subsurface wastewater permits statewide. We supplied municipalities (LPIs) with prenumbered permit forms and received a portion of the permit fees once the permits were issued. IBM's first PCs were perfect for these types of data storage and management.

Gene Moreau reports that the initial start-up period of the new rules implementing the site evaluation method and much more comprehensive regulations governing septic system installation *"was very hectic and like the*

Wild West." Many towns did not have LPI's in place to administer the plumbing permits properly. Site evaluators and LPIs were working with entirely new methodology and needed to be properly trained. Initially the Maine excavating contractors did not like the fact that the State DHE was regulating construction methods for installing septic systems since prior to this time they were very much unregulated. *"The state is not going to tell me what to do"* Moreau explained was a common reply he heard when introducing installers to the new Rules. The acceptance and practice of the Maine SSWD Rules has certainly come a long way in its 50 years!

'Table 9-1' Original Table/Chart estsablished July 1974 to Regulate Site Evaluation in Maine

TABLE 9—1 Soil conditions → Type and size of systems permitted

SOIL GROUPS ↓ / BEDROCK AND GROUNDWATER CONDITIONS →	Shallow to Bedrock (15" to 40" Deep) NOTE: If depth to Bedrock is less than 15" below the bottom of the organic horizon a N.D. System is required. A	Seasonal groundwater at greater than 40" below the bottom of the organic horizon. B	Seasonal groundwater at 15" to 40" below the bottom of the organic horizon. C	Seasonal groundwater at 0" to 15" below the bottom of the organic horizon. D	Seasonal ground water ponding on the surface E
1 Deep **loamy (≥15% sand ≤ 35% clay)	MEDIUM LARGE Trench, Bed, Chamber or Special System | *Thorndike *Mapleton *Benson	MEDIUM LARGE Trench, Bed, Chamber or Special System | Bangor Caribou *Linneus Berkshire	LARGE Bed, Mound or Special System | Dixmont Conant Sutton	Non discharge System | Monarda Easton Leicester	Non discharge System | Burnham Washburn Whitman
2 Deep **loose loamy (≥15% sand≤ 35% clay)	MEDIUM Trench, Bed, Chamber or Special System | Lyman Hollis	MEDIUM Trench, Bed, Chamber or Special System | Charlton	MEDIUM LARGE Trench, Bed, Chamber or Special System	Non discharge System	Non discharge System
3 loamy 40" deep (≥15% sand≤ 35% clay) over Impervious strata e.g. clay, pan.		LARGE Bed, Mound or Special System | Perham Plaisted Potsdam Marlow Paxton Becket Melrose	EXTRA LARGE Mound or Special System | Daigle Howland Crary Peru Woodbridge Skerry Elmwood	Non discharge System | Monarda Ridgebury Swanton	Non discharge System | Burnham Whitman Whately
4 loamy (≥15% sand ≤ 35% clay) over Sandy and/or gravelly		SMALL Trench, Bed, Chamber or Special System | Canton	MEDIUM Trench, Bed, Chamber or Special System	Non discharge System	Non discharge System
5 Deep **sandy and/or gravelly ≥70% sand ≤15% clay ≤30% silt	SMALL Trench, Bed, Chamber or Special System | Canaan	SMALL Trench, Bed, Chamber or Special System | Hermon Gloucester	SMALL Trench, Bed, Chamber or Special System | Waumbek	Non discharge System	Non discharge System
6 Deep **loose sandy and/or gravelly ≥85% sand ≤10% clay ≤15% silt		VERY SMALL Trench, Bed, Chamber or Special System | Colton Hinckley Adams Windsor Merrimac Agawam Stetson Allagash	VERY SMALL Trench, Bed, Chamber or Special System | Duane Croghan Deerfield Sudbury Ninigret Machias Madawaska Skowhegan	Non discharge System | Augres Saugatuck Fredon Red Hook Walpole	Non discharge System | Scarboro Halsey Atherton
7 Deep **silty (≤ 15% sand ≤ 35% clay)		LARGE Bed, Mound or Special System | Salmon Hartland	LARGE Bed, Mound or Special System | Nicholville Belgrade	Non discharge System | Raynham Canandaigua	Non discharge System
8 Deep** Silty and Clayey (≥35% clay)		EXTRA LARGE Mound or Special System | Suffield	EXTRA LARGE Mound or Special System | Buxton	Non discharge System | Scantic	Non discharge System | Biddeford
9 RECENT FLOOD PLAINS Alluvial Soils	NONE | Suncook	NONE | Hadley Ondawa	NONE | Winooski Podunk	NONE | Limerick Rumney	NONE | Saco
10 Organic Soils: Muck, Peat, Swamp, Bog, Marsh (Fresh & Tidal Water)	NONE	NONE	NONE	NONE	NONE
11 Made Land - Cut and Fill	When a site consists of made land, cut and fill land and similar situations, the suitability of the site shall be determined by an on-site investigation. The site investigation report shall list the identity and characteristics of both the fill and the soil the fill was placed on. The more limiting of the two, fill and original soil, shall be the criteria for whether a system can be permitted and which systems and size systems are approvable.				
Notes:	1. *Fractured or Limestone bedrock - No trenches allowed. 2.** Deep soils are those soils where the texture is similar for at least 40 inches or until bedrock is encountered. This is in contrast to soils which are not marked deep, e.g. loamy, where distinct textural changes are present within a 40 inch depth. 3. ≥ means greater than; ≤ means less than. 4. The soil groups are identified primarily through the various particle size percentages as depicted in Table 9-2, Guide for Textural Classification in Soil Families. 5. The water table, impervious layer, and bedrock conditions as described in A through E above, are further defined in Section 4.3 and 8.7.				

Establishment of the Maine Site Evaluation Association

The Maine Association of Site Evaluators was conceived by Lennart Rost in late 1970's. Rost was working for the State of Maine, Division of Health Engineering, as an Engineer in the Wastewater Management Section in the late 1970's and 1980's. He previously had been responsible for starting the Maine Wastewater Control Association. During that time, Albert Frick was the State Site Evaluator working in DHE with Lennart Rost. '*Lenny*' came into Albert Frick's office one day in late 1979 and explained that "*he had previously formed the Maine Wastewater Control Association for Treatment Plant Operators and thought that it would be a promising idea to form a similar association for Maine Licensed Site Evaluators." Lenny further added that "it would give SE's a forum to share ideas, network, and have a more organized and coordinated presence to advocate for Rules and Regulations affecting Site Evaluators in Maine. He said the Association for Maine Treatment Operators was highly successful and productive."*

At the time of Lennart Rost's suggestion to create MASE, the practice of 'Site Evaluation' for designing septic systems had only been in existence in Maine for several years (i.e., since July of 1974).

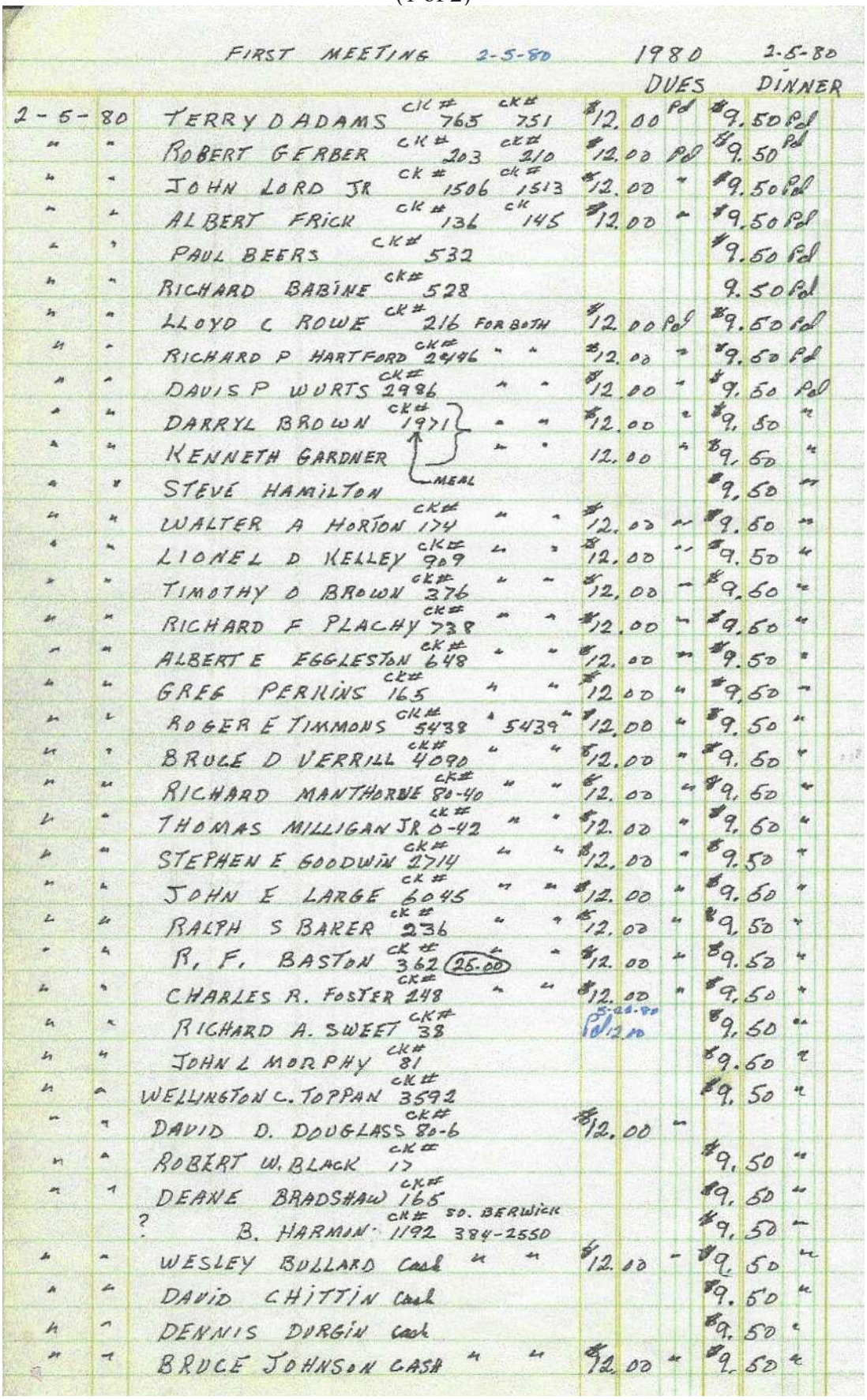
Albert Frick took Lenny Rost's suggestion and consulted with Gene Moreau about proceeding. Moreau thought it was a great idea and felt that Maine Site Evaluators "*need to have an association so site evaluators could compare notes and hopefully improve training among themselves*.

(It is noteworthy that a State agency (DHE) was directly involved and encouraging the private sector of existing Site Evaluators to organize into a formal group so that they would have a louder voice with regards to proposed regulations affecting their professional and perhaps to contribute consensus feedback for consideration.)

Subsequently, Frick went about assembling a group of practicing Site Evaluators consisting of a representation of Professional Engineers, Soil Scientist, Geologist, and 'Others' to determine the interest level. The 'Charter' Group consisted of Richard Manthorne, Al Hodson, Dana Morton, William Rideout, Richard Sweet, Roger Timmons, Earle Rafuse, Ken Gardner, Darryl Brown, and Albert Frick. There was keen interest, and the Charter Group went to work forming what is now called MASE. This group had several preliminary workshops for preliminary organization and planning prior to reaching out to all the currently licensed Site Evaluators to gather and hold the first meeting.

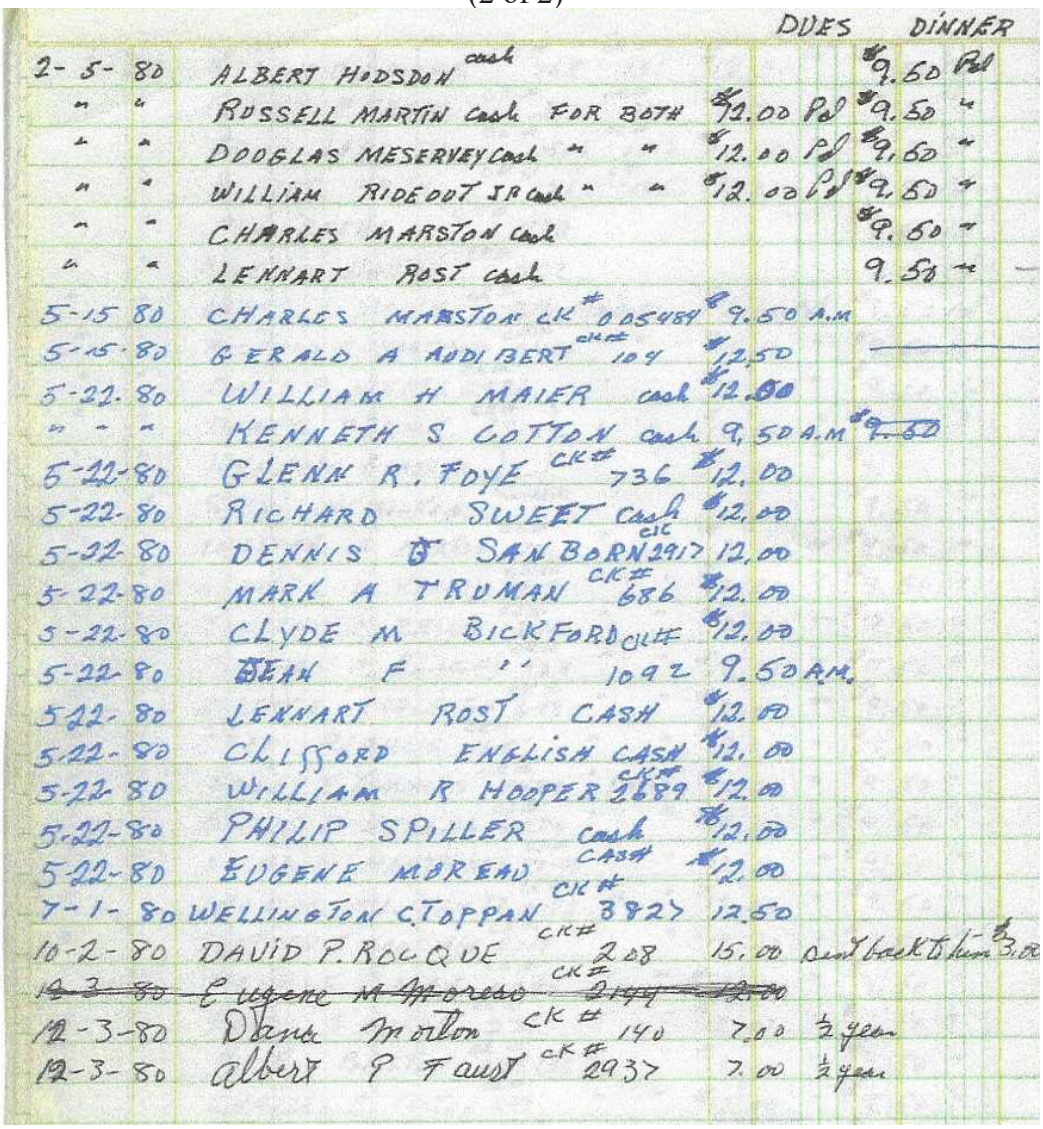
The Association had its first meeting on February 5, 1980. Those in attendance are listed on the following copies of the two registration sheets recorded by the acting treasurer at the time. (See Registry Sheets 1 & 2)

*(*Note: If you happen to find yourself on either of the two lists directly below, which were the **original Charter Members of the MASE** you probably have dug A LOT of test holes to date. My Father once told me*, "If you happen to find yourself in a deep hole you can't get out of... **stop digging!")***



				1980 DUES		2-5-80 DINNER	
		FIRST MEETING 2-5-80					
2-5-80		TERRY D ADAMS	CK# 765 CK# 751	$12.00	Pd	$9.50	Pd
"	"	ROBERT GERBER	CK# 203 CK# 210	$12.00	Pd	$9.50	Pd
"	"	JOHN LORD JR	CK# 1506 CK# 1513	$12.00	"	$9.50	Pd
"	"	ALBERT FRICK	CK# 136 CK 145	$12.00	"	$9.50	Pd
"	"	PAUL BEERS	CK# 532			$9.50	Pd
"	"	RICHARD BABINE	CK# 528			9.50	Pd
"	"	LLOYD C ROWE	CK# 216 FOR BOTH	$12.00	Pd	$9.50	Pd
"	"	RICHARD P HARTFORD	CK# 2446 " "	$12.00	"	$9.50	Pd
"	"	DAVID P WURTS	CK# 2986 " "	$12.00	"	$9.50	Pd
"	"	DARRYL BROWN	CK# 1971 " "	$12.00	"	$9.50	"
"	"	KENNETH GARDNER	MEAL " "	12.00	"	$9.50	"
"	"	STEVE HAMILTON				$9.50	"
"	"	WALTER A HORTON	CK# 174 " "	$12.00	"	$9.50	"
"	"	LIONEL D KELLEY	CK# 909 " "	$12.00	"	$9.50	"
"	"	TIMOTHY O BROWN	CK# 376 " "	$12.00	"	$9.50	"
"	"	RICHARD F PLACHY	CK# 738 " "	$12.00	"	$9.50	"
"	"	ALBERT E EGGLESTON	CK# 648 " "	$12.00	"	$9.50	"
"	"	GREG PERKINS	CK# 165 " "	$12.00	"	$9.50	"
"	"	ROGER E TIMMONS	CK# 5438 " 5439 "	$12.00	"	$9.50	"
"	"	BRUCE D VERRILL	CK# 4090 " "	$12.00	"	$9.50	"
"	"	RICHARD MANTHORNE	CK# 80-40 " "	$12.00	"	$9.50	"
"	"	THOMAS MILLIGAN JR	CK# 0-42 " "	$12.00	"	$9.50	"
"	"	STEPHEN E GOODWIN	CK# 2714 " "	$12.00	"	$9.50	"
"	"	JOHN E LARGE	CK# 6045 " "	$12.00	"	$9.50	"
"	"	RALPH S BAKER	CK# 236 " "	$12.00	"	$9.50	"
"	"	R. F. BASTON	CK# 362 (25.00) " "	$12.00	"	$9.50	"
"	"	CHARLES R. FOSTER	CK# 248 " "	$12.00	"	$9.50	"
"	"	RICHARD A. SWEET	CK# 38	Pd 5-24-80 12.00		$9.50	"
"	"	JOHN L MORPHY	CK# 81			$9.50	"
"	"	WELLINGTON C. TOPPAN	CK# 3592			$9.50	"
"	"	DAVID D. DOUGLASS	CK# 80-6	$12.00	"		
"	"	ROBERT W. BLACK	CK# 17			$9.50	"
"	"	DEANE BRADSHAW	CK# 165			$9.50	"
	?	B. HARMIN	CK# 1192 SO. BERWICK 384-2550			$9.50	"
"	"	WESLEY BULLARD Cash	" "	$12.00	"	$9.50	"
"	"	DAVID CHITTIN Cash				$9.50	"
"	"	DENNIS DURGIN Cash				$9.50	"
"	"	BRUCE JOHNSON CASH	" "	$12.00	"	$9.50	"

Registry of Charter Members in attendance at First Meeting of MASE 2/5/1980
(2 of 2)



		DUES	DINNER
2-5-80	ALBERT HODSDON cash		$9.50 Pd
" "	RUSSELL MARTIN cash FOR BOTH	$12.00 Pd	$9.50 "
" "	DOUGLAS MESERVEY Cash " "	$12.00 Pd	$9.50 "
" "	WILLIAM RIDEOUT JR Cash " "	$12.00 Pd	$9.50 "
" "	CHARLES MARSTON cash		$9.50 "
" "	LENNART ROST cash		9.50 "
5-15 80	CHARLES MARSTON CK # 005484	$9.50 A.M	
5-15-80	GERALD A AUDIBERT CK # 104	$12.50	
5-22-80	WILLIAM H MAIER cash	$12.00	
" " "	KENNETH S COTTON cash	9.50 A.M	$9.50
5-22-80	GLENN R. FOYE CK # 736	$12.00	
5-22-80	RICHARD SWEET Cash CK	$12.00	
5-22 80	DENNIS F SANBORN 2917	12.00	
5-22-80	MARK A TRUMAN CK # 686	$12.00	
5-22-80	CLYDE M BICKFORD CK #	$12.00	
5-22-80	DEAN F " 1092	9.50 A.M.	
5-22-80	LENNART ROST CASH	$12.00	
5-22-80	CLIFFORD ENGLISH CASH	$12.00	
5-22-80	WILLIAM R HOOPER CK # 2689	$12.00	
5-22-80	PHILIP SPILLER cash	$12.00	
5-22-80	EUGENE MOREAD CASH	$12.00	
7-1-80	WELLINGTON C. TOPPAN CK # 3827	12.50	
10-2-80	DAVID P. ROCQUE CK # 208	15.00 Sent back to him	$3.00
~~12-3-80~~	~~Eugene M Moreau CK # 2144~~	~~12.00~~	
12-3-80	Dana Morton CK # 140	7.00 ½ year	
12-3-80	albert P Faust CK # 2937	7.00 ½ year	

MASE was incorporated on July 17, 1980. Richard Manthorne became the first President of MASE.

There was a period of approximately 10 years after the adoption of the Site Evaluator Method, that the program experienced '*growing pains*' due to the transitioning. The newly relicensed and grandfathered SEs at that time were composed of individuals coming from diverse backgrounds (e.g., Professional Engineers, Certified Soil Scientists, Certified Geologists, 'Others' consisting of Local Plumbing Inspectors, Plumbers, and lay people. *'Tug of wars'* over profession *'turf'* were common. Also, the varied background of Licensed Site Evaluators at the time caused a large discrepancy in experience and education; hence there were large discrepancies in interpretation/ evaluation between the practicing SE's. The professional environment during the initial stages of site evaluation practice caused a relatively high frequency of complaints concerning the accuracy of submitted HHE- 200 forms and preliminary suitability tests due to significant differences in reports of the same property.

There have been a few occasions over the years that DHE State Site Evaluators had to take a license due to malpractice through the Maine Administrative Court System. Jim Smith was the Assistant Attorney General assigned to DHE at that time and handled the legal trials prosecuting Site Evaluator malpractice. There have also been several occasions that DHE State Site Evaluators have encouraged or coerced practicing Site Evaluators, who were routinely operating outside the normal acceptable tolerance range, to seek additional education and/

or training for *re-calibration*. The education opportunities provided by MASE helped to train peers addressing the concern above.

Most SEs at that time (as it seems to still be to this day) were sole practitioners. Many didn't know peers to exchange ideas and/or concerns regarding their profession. A forum did not exist where they could discuss mutual problems and present ideas/proposals to DHS to improve rules and regulations regarding the practice of Site Evaluation. MASE became an association to address these deficiencies.

The State of Maine established in 1971 the Land Use Regulation Commission (LURC) to regulate the land use in unorganized townships in the *Great North Woods*. Ken Stratton was appointed by Governor Longley to be the Director of LURC from 1975 until 1978.

There were a lot of changes happening in Maine in the mid 1970's affecting land use and professionals consulting in that industry. The State Planning Office was developing a model for Shoreland Zoning Regulation and promoting and assisting Municipalities to adopt and incorporate into their local land use.

Maine Department of Environmental Protection (DEP) was established on July 1, 1972, and Maine Site Location of Development (Site Law) followed shortly. This law required review of developments that may have substantial effect upon the environment by the Board of Environmental Protection. There were a lot of new land use regulations that practicing Site Evaluators needed to get familiar with that affected their profession at that time.

Accomplishments of MASE:

MASE has been very successful over the years with improving the general quality of Site Evaluation in Maine. MASE has done this with education, administering field seminars, establishment of a viable network for exchange of information of new technologies, and engineering principles pertaining to wastewater disposal design. The formation of the Maine Association of Site Evaluators has also served to allow SE's a mechanism to get to know one another (*putting a face with a HHE-200 form*).

For many years, the Division of Environmental Health (aka DHE) cultivated a very good working relationship with MASE's active Technical Review Committee MASE TRC). This Committee consisted of Ken Stratton, Dave Moyse, Doug Coombs, Dave Marceau, Bill Noble, Earle Rafuse, David Rocque, Dick Babine, Doug Riley, Darryl Brown, and Albert Frick

MASE TRC served as a sounding board to DHE for Rule making ideas and/or concepts by refining the proposals by running it by practicing professionals prior to subjecting it formally to the public proposed rulemaking procedure: thereby becoming a stronger advocate with a coordinated consensus voice for rules and regulations affecting their profession.

MASE Site Evaluators who are practicing and designing septic systems (almost on a daily basis) should be cognitive of the contributions of Don Hoxie, Clough Toppan, Eugene Moreau, Ken Stratton, Roland Struchtemeyer, Robert Rourke, Lenny Rost, and (Rein Laak) and others made to improve Site Evaluation in Maine. This group of engineers and soil scientists conducted the necessary research and successfully applied it to the practice of Maine Site Evaluation to develop an improved innovative method of designing septic systems in Maine. **One of the main reasons for well working septic systems in Maine with long longevity is because this group of professionals got it right and a lot of undertakings and hard work had to be done to make it happen!**

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QUALITY OF SERVICES

by DAVID W. MOYSE, LSS, PWS, LSE

Introduction - As you get a little more "longer in the tooth", like me, you have more time (maybe?) to think about the services we are providing to the public as "Site Evaluators". Every year I come back to the same theme as my primary goal, *provide a quality service and charge appropriately for that quality service*! Sometimes when you get so busy as we all have been, particularly the over last few years, it's so easy to get into a "rut" and become somewhat "robotic" and "indifferent" in our work. The focus is commonly, "getting it out the door" so perhaps that Contractor or Realtor stops chewing your ear! This leads to being so concerned about getting the work done and the findings reported or designed that maybe we don't do our "best work" and really serve our Clients properly. I know that happens to me, don't think I'm along on this?

During this "slower time of the year", if there is such a thing anymore, I'd like to encourage all Maine Licensed Site Evaluators to take a deep breath and review. Self-critique everything from what you do at the initial Client contact, through your field work and ultimately providing your finished product. Don't be afraid to ask for a little "peer review" if you have someone you can rely on for that. I certainly don't have all the answers and many of you may do this already. I'm just trying to kickstart this thought process for you and promote this QAQC effort that I would hope will make us all better LSEs.

The most important task on your list should be to get PAID for your time! This is a business. Everyone's time is valuable and you should be paid for providing a quality service. When you go to a doctor, lawyer or even the car "repair guy", you know going in that they're going to charge for their time…and they certainly do! Why should LSEs be any different. Also, a reasonable but appropriate fee instills respect for our profession and the hard work we do. We need to dispel any thought that our work is simply something to "check off" the proverbial list and is of limited value!

Preliminary Site Evaluations - On Page 34 of the Site Evaluators Manual (2001) it summarizes the recommended approach to preliminary site evaluations ("prelims") in the section title *Preliminary Concepts*. It suggests that the prospective buyer or Applicant ("Client") may have a good idea of where they want to build on a parcel they are looking to purchase. It also suggests that our goal as the LSE should be to evaluate that desired location and determine if it is suitable for the proposed development. If it's not a suitable location, we should offer alternatives to the Client and our recommendations as the "professional" on the job.

When we conduct a prelim for a Client, take the time to do a little "off-site prep". Ask the appropriate questions before you even leave your office to help you do your job thoroughly. This provides the Client with a clear understanding of what you will be doing out on the site and what they will get for their money. Many attorneys will tell you that a prelim will likely put you at as much "risk", if not more, than a formal site evaluation and design because there are more unknowns and you have less control over what happens on a given site after you report your findings. You often don't get to design the system you did the prelim for. For that reason, many LSEs won't do prelims.

Office to start:

- Client Info (Buyer or Seller) - name, address and phone number

- Site Info - address, property map such as survey or tax map; zoning; are pins and lines marked? Is it wooded and accessible; landowner permission to access? etc.
- On-site meeting date & time if you're meeting the Client?
- Agreed upon deliverables (sketch, report, logs)
- Agreed upon fee and payable when?

We all have our basic procedures and standard way of completing a prelim in the field, but here are some basic suggestions:

- Meet the Buyer/Seller if you can
- Evaluate the area where the Buyer would like to build, if known. If they can't meet you and the prelim is for the Seller, pick a spot where you as the "expert" think would be best based on access; view; soils; slope; protected resources; setback from wells, road and sidelines (maybe 100 feet off the road and far enough away from sidelines to allow buffer to neighbors?), zoning, etc.
- Make the effort to do a prelim of "value". Don't simply walk off the road, go 25 feet onto the site and do your soils test pit. The disposal field will likely never go there and the findings will be of very little benefit to anyone.
- Do a couple of different spots if you can to provide the buyer with favorable options
- Flag and label each test pit location. Locate the spot with the GPS on your phone, a GPS unit or at least with a couple of measurements from fixed, known features such as the road or a property line/pin so you can provide a Sketch/Map

Back in the office, produce and provide a quality summary of findings, which may include:

- Written report describing the prelim request and purpose
    - Summarize what the Rules require as a minimum for the project on that site
    - Describe the site conditions and your findings (soil profile, limiting factors, slope, stoniness, suitable area size)
    - Provide whatever recommendations you may have to help the Client finalize their decision, such system type and components (is advanced treatment required? survey needed? backhoe test pits needed? etc.)
- Soil log
- Map or Sketch - Overlay your field data such the test pit locations and possibly the area of suitable soils onto some type of base map as accurately as possible (aerial photo, tax map, survey, etc.)

Septic System Design – We can spend all day talking about the right way to do the formal site evaluation and septic system design (HHE-200 Forms). I'm not sure that there is one "right way", except that we need to follow the Site Evaluators Manual, the current Maine Subsurface Wastewater Disposal Rules and the current "Standards of Practice". The last one is always the tricky one and a primary reason we all need to stay in tune with our peers and the "latest and greatest" that technology has to offer by being part of MASE and attending our workshops and meetings. If you're an "active" LSE, the answer can't be… "your Honor, I had no idea everyone was doing it that way now"! There is a certain amount of "due diligence" that is expected of us when we do our work folks.

In the office, the same info is needed as for prelims, and more:

- Owner/Applicant Info - Page 1 of HHE-200
- Site Info - Hidden limitations like zoning or deed covenants. We really need to emphasize the value of a property boundary survey…Who in the world in 2024 owns or buys a parcel of land that they want to build a home on and doesn't know for sure where their property lines are based on a survey?? = **LOTS of PEOPLE!**

- Design flow info, what is being proposed?
- Is any of the project staked out and is there a corresponding site plan or sketch?
- Review available published mapping, such as GIS soils, wetlands and habitats
- Ideal to schedule on-site meeting to review site conditions and proposed project with Owner and/or their Builder and Earthwork Contractor
- Agreed upon fee and payable when?

Out on-site:

- Ideally, meet both the Owner/Applicant and their Contractor on the site to confirm your "project understanding/ the project particulars" and review your intended system design and layout. Always nice to accommodate the Earthwork Contractor's desire for system type, but remember that regardless, it's YOUR DESIGN. Your goal should always be what's BEST FOR THE CLIENT! Never "fun" to do a layout several times.
- Be sure that you know what is on the site, and beyond! This includes resources, wells or activities/uses of adjacent land that may affect development of the site
- You may not profess to be an expert in wetlands, soils, surveying, etc., but again we have a certain amount of required due diligence these days to at least inquire and be sure the Applicant/Owner is aware of all the considerations…any other permits that they may need?
- Do an adequate number of test pits so you are "comfortable" with your soil evaluation. For example, if a backhoe test pit is needed because of a bedrock concern, come back again to do that before you finalize
- Double check your key measurements and be sure that all your layout is clear and well-marked to help avoid any subsequent, potential issues (Contractor, etc.)
- Don't underestimate the value of some key field equipment like a laser level and a reliable GPS unit to help with your measurements. They are worth every penny.

Back in the office, Final design:

- Provide a "quality" product that we all can be proud of and one that again, displays the value of your hard work and represents the profession well. Please, let's avoid any more of those site plans that consist of only two lines and a rectangle!
- Take advantage of the several computer-aided drafting programs out there that produce an attractive and clearly legible design document. You don't have to spend thousands $ to put out a nice product.
- Be sure the design has all the info both the Owner/Applicant and Contractor need
- Please consider requiring an" as-built" sketch or attach a one-page form (I'm posting my form on the MASE website that anyone can freely download and use and edit…or whatever, if that helps. I know Brent, you've heard this enough from me! However, we can't expect septic system inspections to be done properly and thoroughly if no one knows where the tank is and what actually "went in the ground" after we did our part? The design on file is great if that is what was actually installed, but that is rarely the case, particularly with the tank location.

Well, that's enough from me on this subject for now. Please consider some of this article if it's helpful and lets all continue to try to make our profession one we are proud of. Thanks for your time…have a great 2024!

SEPTIC SYSTEM SHORT CIRCUITS CONTRIBUTE TO SURFACE WATER QUALITY DEGRADATION

By Dave Rocque
January 2024

Most septic system regulators, designers, installers and inspectors know that septic systems were primarily designed to protect the public health and welfare from pathogens that are often found in human wastewater. Pathogens in wastewater not only can make people sick, they can kill people. So, it is appropriate that septic system regulations focus on preventing people from coming into contact with viable pathogens from domestic wastewater. For the most part, that is accomplished by getting the wastewater to quickly infiltrate into the ground and setback distances from wells and waterbodies. It is a well-known fact that most pathogens can only live for a relatively short amount of time outside of their preferred environment. So, if a septic system is setback far enough that pathogens die before they reach the well or waterbody, people will be adequately protected from them.

What most people don't realize is that, for the most part, septic system regulations across the country do not purposely take into consideration the fate of nutrients in domestic wastewater. Unlike pathogens, nutrients do not die. Fortunately, most, but not all on-site septic systems do provide for some nutrient reduction, inadvertent though it may be. Those septic systems that provide little to no nutrient attenuation are what I refer to as "Short Circuits". Short circuiting septic systems can and do impact surface waterbodies when they are installed within the watershed of waterbodies. The closer to the waterbody they are located, the greater and more immediate the impact. The problem of short-circuiting septic systems is being increasingly recognized in a number of east coast states where surface water quality degradation is a widespread problem. The state of New Hampshire estimates that 30% of the nutrient loading to their surface waterbodies comes from septic systems and so they contracted with a consulting firm, that has offices in Maine and New Hampshire, to advise them on how to reduce nutrient loading from septic systems installed near waterbodies. I was hired as a technical expert to assist with the development their final report.

While an excess of any nutrient can contribute to water quality degradation, the nutrients of greatest concern are nitrogen, which is the limiting nutrient for algae blooms in flowing waters and the ocean, and phosphorous, which is the limiting nutrient for algae blooms in lakes and ponds. Nitrogen is an anion so it is not tied up in the soil by cation exchange and is primarily removed through being taken up by plants and soil microbes. Some natural denitrification also occurs in the soil, particularly in wet soils, if the nitrogen is converted to nitrates and nitrites first. Algae blooms are not only unsightly and smelly, they can also contain toxic compounds from cyano-bacteria.

Attenuating nitrogen from septic systems is a well known and relatively simple process where the ammonia present in wastewater is converted to nitrites and nitrates by being exposed to oxygen and then being placed in an anaerobic environment with a carbon source. Microbes utilize the oxygen attached to the nitrogen in order to decompose the carbon which then allows the nitrogen to escape as a gas. There are a number of advanced treatment units available today that will remove nitrogen though denitrification and a couple of experimental systems that do it passively.

For lakes and ponds however, it is phosphorous that is the nutrient of primary concern and there are currently no approved advanced technology systems available that will remove it from the wastewater stream (there are a couple of experimental systems being studied that have some promise but are expensive and need continual and costly maintenance). Since phosphorous is a cation, it can be removed by cation exchange capacity that

is provided by soils with some silt and clay in them. Phosphorous can also be made unavailable for plants, including algae found in lakes and ponds, by combining with various iron and aluminum minerals to either precipitate out or form inert compounds. A third method for removing phosphorous from wastewater in an on-site septic system is by plant and microbe uptake.

Most of our parent material soils here in Maine do have silt and clay in them. In addition, most of our soils have a shallow depth to hardpan, bedrock or seasonal groundwater table, requiring disposal fields to be installed in or above the topsoil layer of the natural soil. The topsoil layer is considered to be the most biologically active part of the soil; where most of the microbes and plant roots can be found. It is also where much of the available iron and aluminum can be found that will tie up phosphorous. For sandy or gravelly outwash soils, it is also where the only cation exchange capacity exists. Disposal fields installed in or above the topsoil layer, provide excellent nutrient removal or retention. When however, the disposal field is installed in a sand or gravel soil that does not have a shallow limiting factor, it is usually installed on or in the "C" horizon which is silt and clay free sand or gravel. The "C" horizon of sands and gravels does not have any cation exchange capacity, microbes or plant roots or much iron or aluminum so the phosphorous will leach down into the groundwater table where it can then travel to a lake or pond, if one is nearby. This is what I call a "short Circuit". The septic system appears to be working just fine but is not removing important nutrients that will contribute to water quality decline. Maine does require a layer of "backfill" material to be installed between the prepared infiltrative surface and bottom of a disposal field in such instances to prevent short circuiting. Backfill material is supposed to have 2% - 8% fines in it but the tendency of installers is to err on the conservative side and so the backfill material is often as clean as the underlying sand or gravel layer.

Short circuiting is also a concern with disposal fields installed on shallow to bedrock soils. The problem occurs when a contractor prepares the infiltrative surface by removing the organic duff or topsoil layer. If the excavation exposes fractured bedrock, and then a clean sand or gravel is added to bring the ground surface up to grade, a short circuit can be the result where effluent can travel, relatively untreated, into the fractures and then into the groundwater table.

The most effective and least costly method to prevent these short circuits is to install the disposal field on top of or into the topsoil layer. The topsoil layer is where the plant roots and microbes are and has some cation exchange capacity. It also has soil pores too small to allow for short circuiting. These small pores (capillary pores), will draw water sideways and even up in the soil horizon. Nutrients, including phosphorous and nitrogen will thereby be retained and made available to microbes and plant roots.

You can't add fine textured soil to an excavation made to install a disposal field and have the same outcome because of its effect on the natural soil porosity. Natural soils, that are not compacted, have granular structure in the upper horizons, created by microbial activity decomposing organic matter. In place, this structure will provide the pore space for wastewater to move into and through the soil. If the soil is removed however, the natural structure is destroyed, along with its porosity. It is therefore, important to protect the natural soil structure (scarification and transition horizon) when installing a disposal field.

Installing a disposal field on or in the topsoil horizon of a sand or gravel soil will require a "bump" on a lot and a larger disposal field foot print but it is much less expensive than requiring an advanced treatment system that needs continual maintenance and replacement and is a small price to pay to help protect water quality. A number of states are now requiring nutrient reduction septic systems in "sensitive areas". Maine may not be far behind. Using the natural approach, when possible, only makes sense. For densely developed shorefront areas, advanced treatment units may be the only viable option but for undeveloped lots on sandy or gravelly soils, shallow installations should be encouraged, if not required. If the soil is shallow to bedrock, the installer should take care to leave some native soil above bedrock, to prevent a short circuit. I believe Maine will eventually gravitate to this design method, whether by state regulators, local ordinances or lake association recommendations.

I have developed a list of soil series found in Maine that I consider to be "sensitive" meaning that they have the potential for having short circuiting septic systems. This list is recognized by the Maine Department of Environmental Protection and is being used by consultants when doing lake watershed assessments. As you might expect, the most likely soils to have short circuiting septic systems are of outwash parent material, profile 5 and 6 but also some profile 11 (sandy alluvial soils) and some profile 4 soils (coarse ablation tills). The list also includes shallow to bedrock soils (less than 20 inches to bedrock) because they can have all of the topsoil above bedrock, in the shallower parts, removed in the preparation process for a disposal field installation.

I was hired by a consulting firm last year to evaluate 6 septic systems along the shoreline of Georges Pond in the town of Franklin, for indications of short circuiting. Georges Pond recently experienced a very significant algae bloom which turned the entire lake green. It has since undergone an alum treatment which successfully tied up the excess phosphorous, ending the algae bloom. The fix however, is only temporary, unless the contribution of phosphorous to the lake from outside sources is identified and addressed. A few years ago, I did a gravel roads assessment around the pond, at the request of the lake association, and noted that there was a considerable amount of outwash sands in the watershed. At that time, I recommended an evaluation of septic systems for potential short circuits. The lake association chose 6 septic systems for me to evaluate, without any input from me. The 6 were selected on the basis of age, location and, especially important, the willingness of the owners to let me look at them. Of the 6 septic systems I looked at, three were pre-1974 and the other three were installed post 1974, during the Site Evaluation era. As might be expected, all three pre-1974 systems were not functioning and were likely contributors to the degradation of lake water quality. What was a surprise though, was that 2 of the three post-1974 systems were also considered to be significant contributors to lake water quality degradation. One of these newer systems was designed and installed per the SSWWD Rules but was short circuiting. I made this determination by noting the lack of any bio-mat even though it had been used for over 20 years and it was installed into a clean sand layer. The other newer system, I do not believe was designed by a site evaluator (no HHE-200 form could be found) because it was installed in an area where water ponded and it blocked the drainage channel that drained the ponded area (I found the channel beyond where fill had been added). The contractor then dug a new channel to outlet the water that now ponded in back of the disposal field, a foot away from one leachfield perforated pipe. The new channel, which showed evidence of having flowing water in the wet season) connected to the old channel. Coarse sand was used between the drainage pipe and the ditch, providing a direct conduit for effluent to reach the lake. This was a very significant short circuit of the manmade variety and was especially significant because the home was used year-round.

The bottom line is that short circuiting septic systems are a recognized problem that will only become more important as development pressure increase. I believe that future regulations will require septic systems that incorporate nutrient reductions. That can be accomplished by relatively expensive and maintenance demanding advanced technology units or a more passive method of using native soil horizons. Most likely, both will be used. Stay tuned.

SOIL SERIES POTENTIAL FOR HAVING A SHORT CIRCUITING SEPTIC SYSTEM BASED ON SOIL PROPERTIES

December 8, 2023

The following soil series are rated on the potential for them to have short circuiting septic systems, based on soil texture and depth to bedrock. A short circuit occurs when effluent from the leach field freely drains into a coarse textured soil horizon or bedrock fractures without being partially renovated first, on its way to the groundwater table. In most leach fields that are used **year-round**, particles escaping from the septic tank plus the living and dead bodies of microbes partially fill some of the voids in the soil below it forming what is called a "bio-mat". This bio-mat is where a great deal of the treatment from a septic system occurs and is an essential part of a properly functioning septic system. The bio-mat looks like a black gelatinous material that coats sand and rocks at the interface between the bottom of the leach field and soil below. The soil, including plant roots and soil microbes, then finish the treatment process. This bio-mat usually causes some ponding of effluent as it is quite slowly permeable. The presence or absence of a bio-mat can usually be determining by the presence of ponded effluent. If however, the bottom of the leach field is on or in a coarse sand or gravel or rests on fractured bedrock, particles and microbes may not be able to accumulate to the degree that a bio-mat is formed. If that happens, the wastewater, along with most of the phosphorus, can travel down to the groundwater table and then move to a nearby lake, pond or stream. Not only do sandy or gravelly soils not always form a bio-mat, they do not provide as much treatment as do finer textured soils (silt and clay provide most of the soil treatment) so many of the nutrients can reach a waterbody, if nearby. You should also be aware that some of the newer types of leach fields such as Eljen In-Drains, Enviro-Fins, fabric wrapped pipes and advanced treatment units remove particulates from the wastewater so a bio-mat will not form even if the soil is not sand or gravel. You therefore, need to take the type of leach field into consideration when evaluating the short circuit potential of a newer septic system in any soil type. It is also important to consider the frequency of use of a septic system and how much of the year it is used. Lightly used septic systems (a single elderly person, for instance) or those used only a few weeks a year, may not have a bio-mat because of low usage or because there is a long enough time between usage (seasonal dwellings) that the bio-mat is decomposed each off-season. It is also important to understand that a short-circuit will not occur if the disposal field is installed completely into a fine textured soil, unless the bottom of the disposal field rests on or is connected to fractured bedrock or sand/gravel layers by sandy/gravelly fill material.

When considering the potential for a soil series identified on a soil map developed by the Natural Resources Conservation Service (NRCS) to have a short-circuiting septic system, it is important to keep in mind the following: 1) soil series established by the NRCS have an allowable "range of characteristics" meaning that they can have variable textures, thicknesses of soil horizons and other variable soil properties. This rating is based on the average of those properties (based on the "official Soil Series" description by the NRCS), 2) most of the soil mapping by NRCS was done in the 1940's – 1970's. A lot has happened over the years that may have altered the soils including topsoil removal, erosion, sedimentation, adding fill, culverts draining on the land and drainage ditches being dug. Those soils may now not have the same characteristics they did when the mapping was done, 3) County soil maps can only show different types of soil as small as about 3 acres. Any different type of soil encountered that is smaller than 3 acres will not show up on a County soil map and is considered to be an "inclusion". It is possible that a septic system is installed in an inclusion within a soil map unit that differs from the named soil series, sometimes they are significantly different, 4) septic system design and installation are important factors affecting the likelihood of short circuiting. If a leach field is designed to be installed on top of the ground over a sandy soil with a fine textured topsoil layer, the likelihood of a short circuit is small but if the leach field is designed to be installed below the topsoil layer, into sand or gravel, the likelihood of a short circuit is much greater. The same is true for the installation. A contractor may over excavate the topsoil

layer of a sandy soil and then place sand/gravel in the excavation so it will be at the correct elevation. This can result in a direct connection between the bottom of the leach field and the sand or gravel below even if the design shows the bottom of the leach field being on top of or within the finer textured topsoil layer, and 5) Age of System. Septic systems installed prior to 1974 were based on a "perc test" as compared to our present system of "Site Evaluation" which is a much more accurate and we have many more types of systems to use now. Also, beginning in 1995, all septic systems installed within the shoreland zone in coarse textured soils were required to use a liner of soil material that had some silt in it below and beside the leach field to slow down infiltration and encourage the formation of a bio-mat. Unfortunately, contractors tend to err on the side of using fill material that is on the too coarse side so the fill material does not provide fine soil particles to slow down effluent and remove some of the nutrients. Septic systems installed in sandy or gravelly soils prior to 1974 have a very high likelihood of short circuiting. Septic systems installed between 1974 and 1995 have a greater likelihood of short circuiting than those installed after 1995 but less than those installed prior to 1974.

In the rating system below, I based the relative risk of a short-circuit on the texture of the soil parent material below any topsoil layer and the likelihood that the bottom of a disposal field would be installed on top of or into sandy or gravelly subsoils. If it is very likely that a disposal field bottom will connect with sandy or gravelly subsoils, the rating is very high. The less likely that there will be a direct connection between the bottom of a disposal field and sandy or gravelly subsoil layers, the lower the rating will be.

Soils with very high potential to have short circuiting septic systems: Soil names in () are names no longer used in Maine but may be found on older versions of County Soil Survey maps. These sandy/gravelly outwash soils are well to excessively drained (no seasonal groundwater table within 48" depth) so it is very likely that the bottom of a disposal field will be installed at least 24" below the ground surface and into sand or gravel layers.

Hermon, Colton, (Hinkley) Monadnock, Masardis, Stetson, Machias, (Windsor), Adams, Sunday, Windsor, (Merrimac).

Soils with high potential to have short circuiting: These sandy/gravelly outwash soils are moderately well drained meaning that the seasonal groundwater table is present between 16" and 48" below the mineral soil surface. The septic system rules require a 24" separation between the bottom of a disposal field and any limiting factor (seasonal groundwater table, hardpan or bedrock) in sand and gravel outwash soils. That means a soil would need to have a seasonal groundwater table at a depth of greater than 24" for the disposal field to be installed into the ground and 36" for the disposal field to be installed 12" into the ground (the thickness of the topsoil layer for most outwash soils). There is therefore, a less but still significant likelihood that a disposal field will be installed down into the sand and gravel layers so it is rated as high instead of very high.

Skowhegan, Duane, (Ninigret), Croghan, (Deerfield), Waumbek, Sheepscot, Madawaska, Machias.

Soils with moderate potential to have a short circuit: Some of these soils have thick topsoil layers that may be over 24" thick (Allagash and Fryeburg) or are somewhat poorly drained (15" – 7" to swt), poorly drained (less than 7" to swt) and very poorly drained (swt at or above the mineral soil surface) meaning that a disposal field would have to be installed above the original ground surface to achieve a 24" separation distance from the bottom of the disposal field to the seasonal groundwater table. Wet soils do not usually have all of the topsoil layer removed, down to the sand or gravel layers, in order to install a disposal field so the risk of a short-circuit is relatively low but is still there and there is not much depth to the groundwater table.

(Agawam), Allagash, (Fredon), Fryeburg, Naskeag, Naumburg, Kinsman, Moosilauke, (Walpole), (Au Gres), (Finch), (Saugatuck), (Red hook), Atherton, (Halsey), Scarboro, Searsport.

The following soils have a very high or high rating for the potential to have a short-circuiting septic system but not due to soil texture. They have a high rating because bedrock is present in them at a depth of less than 20"

(few septic systems are installed below a depth of 24”). These soils have suitable soil textures to encourage the formation of a bio-mat and provide additional treatment by the soil. The risk in these soils is if the bottom of a leach field rests on fractured bedrock or if the contractor over excavates native soil over bedrock and then uses coarse sand or gravel fill between the bottom of the leach field and bedrock. If native soil material is present between the bottom of the leach field and bedrock, the potential for a short circuiting is very low. If there is a direct connection between the bottom of the leach field and bedrock or coarse sand or gravel fill is used between the bottom of the leach field and bedrock, the potential for a short circuit is very high. It is also important to note that hard granitic bedrock poses the highest potential for contamination of a nearby body of water and sedimentary bedrock poses the lowest potential. That is because sedimentary bedrock is often soft in the top, where it meets mineral soil, and thereby acts more like soil than hard bedrock does. Sedimentary bedrock has to be relatively hard to have open fractures.

Very shallow to bedrock soils (Less than 10”) with a very high potential for a short circuit: These soils are very shallow to bedrock meaning that there is less than 10” of soil over bedrock so the likelihood that a contractor will scrape it all off when preparing to install a disposal field is quite high. The sandy/gravelly fill material used for the installation of a disposal field may then rest directly on fractured bedrock causing a short circuit.

Abram, schoodic, Ricker, Knob Lock, Mahoosuc.

Shallow to bedrock soils with high potential for a short circuit: These soils have a depth to bedrock of 10” – 20” and likely have inclusions of soils with a shallower depth so the likelihood of a contractor scraping all of the soil from at least some bedrock areas is high but not as high as for very shallow soils.

Thorndike, Monson, Corrina, (Benson), Creasey, Lyman, (Hollis), Hogback, Saddleback, Canaan.

The only way to really find out what your actual soil type, where your leach field is installed, is to have a site-specific soil investigation done by a soil scientist or site evaluator. You can also look at the HHE-200 form for a septic system already installed to see what the soil type is and if there is bedrock present and at what depth.

Why I Think Invasive Species Are a Problem in Maine

By David L. Marceau LSE 246, CSS 182

Invasive species is a topic I hesitated to tackle because of the breadth and complexity of what makes the list. However, because of the critical need for our communities to combat their damaging effects, I decided I would. This article can't possibly identify all the invasive species (plants, insects and animals) in Maine's forests, fields, roadsides, and aquatic habitats. There are simply too many. Rather, my objective is to lead you to resources that can help you identify invasive species and suggest some ways in which you can limit their spread and mitigate the impacts.

It's a far-reaching problem and I will do my best to describe to you the impacts, discuss a few mitigation strategies and provide websites and other contact information that you can refer to and learn more. One thing to bear in mind is the list of invasive species is not static. It changes (usually expands) when the folks in various agencies get together and evaluate the impacts of non-native species on Maine's environment as they spread. I realize that pictures are helpful in explaining many of these species. However, I have chosen to refer you to websites for pictures.

The Department of Agriculture, Conservation and (DACF) in Maine describes an **invasive species** as *a species that is not native to an ecosystem and causes economic or environmental harm or harm to human health*. This is a very broad definition which encompasses plants as well as animals, and by my way of thinking, is dependent upon where you live and how you spend your time outdoors. Maine is a big state with a variety of habitats.

So, how does one find a list of species that are considered invasive in Maine? This is not as easy as it might seem. My initial web search found a list of 38 biological species most of which were plants. However, some are insects and there was even a fish (Alewife). It became clear to me that this was not a comprehensive list of the invasive species threatening Maine. So, I continued my search and discovered a lot more information about invasive species on the *Maine.gov* website that contains six different links for species that are tracked by various agencies in the State of Maine. I will discuss each of these in turn.

First, **Invasive Aquatic Plants** are maintained by the Department of Environmental Protection (DEP). This link shows a map of where species are located, pictures of various species, a list of associations that monitor these species and actions one can take to prevent or mitigate them. As you might expect, the prevention and mitigation strategies relate to the elimination of aquatic plants on boats. I found this very helpful.

The second link provides a list of **Invasive Forest/Tree Pests**. This list is maintained by the Maine Forest Service under the DACF. These pests are broken down into three categories: *wood borers, piercing-sucking insects, defoliators and diseases*. Each category had pictures of the insects or disease, where the species originated, the host tree, status (whether it is established in Maine), nearest location, description, signs and symptoms and the damage they cause. I also found this to be very helpful although it doesn't contain a map showing where these species are currently located. In their defense, it seems to me that this is a very difficult thing to do given the amount of forest in the State of Maine.

The third link on the *Maine.gov website* was **Invasive Fish.** This list is maintained by the Department of Inland Fisheries and Wildlife (DIFW). The site appears to be focused on baitfish primarily. It provides a list of legal baitfish and talks about how to prevent their spread but does not mention some fish I consider to be

invasive. Three types of fish that come to my mind as invasive to Maine are: Northern Pike; Muskie; and Crappy. However, when I reexamined the definition of what constitutes an invasive (harmful) species, it is not enough to be nonnative. It has to also be damaging in some material way. That is, they cause some economic or environmental harm. I know some people love to fish for these species so maybe IFW thinks there is no environmental or economic harm. My bet is this is controversial topic amongst anglers and may need some additional research to assess the true impacts.

The forth link is for **Marine Invaders**. This list is maintained by the Department of Marine Resources (DMR). At first glance, this site seems to be primarily focused on crabs. However, as you look further you'll find a paper entitled *Marine Invasive State of the Gulf Report*. This report lists snails, algae and periwinkles that are transported by ballast water from commercial ships. I know by reading and watching the news that Green crab, Asian Shore Crabs and Chinese Mitten Carbs harm soft shell clam habitat. This site is very helpful in explaining how invasive marine species are damaging but pretty discouraging when it comes to mitigating there expansion. This makes sense because part of the dependence on us limiting their spread depends on people who are not citizens of the State of Maine. Also, as a novice in this area, a few questions came up that the site did not answer. For example, how far out in the ocean is considered "Maine"?

The next link on the list is **Plant Health Pests**. This is maintained by the DACF. This site leads you to the **Cooperative Agricultural Pest Survey (CAPS)** which is a national pest detection program funded through a cooperative agreement between the Maine Department of Agriculture, Conservation and Forestry, Division of Animal and Plant Health and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS).

The goal of the program is to provide an early warning system for pest detection and response that is critical for protecting our nation's agricultural and natural resources. Typical surveys target exotic and invasive pests and pests of export significance.

It makes sense that this link would include monitoring from other states Maine because insects and diseases are carried by the wind and are transported by vehicles across state lines. Also, it is apparent to me that some of the insects and diseases on their list overlap with the Maine Forest Service invasive forest/tree pests list. It provided the common and scientific names of 44 species, pictures of insects and diseases, people to contact to notify of outbreaks, control strategies and maps of the counties that have infestations. The information on this link was very helpful.

The last link is the **Advisory List of Invasive Plants**. This is maintained by the DACF. This is the link that gave me the biggest pause. First, it lists 1250 plants! How is anyone supposed to keep track of so many plants? Then you realize that the list is not regulatory list and as such many or may not be banned for sale and propagation in Maine. Actual banned plants are listed on the Do Not Sell List which is maintained by DACF primarily for nurseries.

I think all of the State agencies listed above through their websites allow you to submit a digital photo of the plant/disease/animal you found and most have maps of where infestations have occurred so you can see where you are in relation to the overall problems.

Most invasive species will never be eradicated. Thus, the best strategy is to manage them as best we can. This means eliminating them where we can and stopping their spread in our individual spaces. All of these species have found ways to out-compete our native species and you likely can't control enough land to eradicate them even if you were vigilant.

As for me, I admit for the longest time I considered invasive species an annoyance rather than the serious problem that they are. After all (I thought), they don't affect my life style or income so what was the problem?

Well, my perspective has changed and I can see that some invasive species have indeed affected my life style and income. I have had to spend many hours cutting brown tail moths out of my fruit trees each spring for the last 4 years. Also, this year, apparently because of multiple years of infection, 20 mature red oak trees died near my house. My ash trees appear healthy for the time being. However, I am told the emerald ask borer is not far away and I will lose them once they become infected. Oh, and don't get me going on ticks. I haven't had any severe repercussions from them (yet) but have had to take pills for as long as a week. Then there are the northern pike that have invaded some of my favorite brook trout ponds in northern Maine and multiflora rose that has taken over a lot of my woodland. I have chosen to keep a close eye on things and cut out as many plant infestations as possible and spraying pesticides at critical times in limited areas.

Finally, the Maine Invasive Species Network (MISN) brings together both professionals and amateurs who are interested in understanding and managing invasive species in Maine.

The network includes Department of Agriculture, Conservation, and Forestry, University of Maine, Nature Conservancy, Colby College, Unity College, Soil and Water Conservation Districts, Maine Lakes Society, several land trusts, and private land management companies. We also have many citizens who are simply concerned about land stewardship and preservation of natural ecosystems. April 11, 2024 the network will hold a meeting at the University of Maine in Orono.

In summary, I am glad that I spent the time to investigate invasive species in Maine. The list of invasive species is extensive and appears to be somewhat controversial. I learned several new species of which I wasn't aware and also where to get more information, including contacts for people who keep track of infestations. I encourage you to take advantage of these information resources and do your small part to help prevent the spread of invasive species in Maine.

MASE Newsletter

February 2024

MAINE ASSOCIATION OF SITE EVALUATORS

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Send articles, photos, news, and other publication items to:
Richard Green, mainesepticdesign@gmail.com
(207)725-4078 ***MASE website: www.mainese.com***

Directions to the Jeff's Catering

15 Eventcenter Way, Brewer , ME

Annual Meeting February 27, 2024

From I-95 North or South:

Take Exit 182-A onto 395 East. Travel to Exit #5 (Parkway South) and turn left at end of exit. Go just past the Brewer Police & Fire station and take the very next right into the East West Industrial Park (Robertson Blvd) and Jeff's Catering is about 200 yards on the left.

From Ellsworth:

From Ellsworth take 395 West. Travel to Exit #5 (Parkway South) and turn left at end of exit. Go just past the Brewer Police & Fire station and take the very next right into the East West Industrial Park (Robertson Blvd) and Jeff's Catering is about 200 yards on the left.