

1998 Peat System Assessment

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The State of Maine has regulated onsite sewage disposal since 1926, to varying degrees. Over the years, the Maine State Plumbing Code, Subsurface Wastewater Disposal Rules (Rules) and their antecedents have been updated to reflect changing technology and areas of regulatory emphasis.

Relevant to this presentation was the inclusion of onsite peat sewage treatment systems (peat systems) in the Rules as experimental systems in 1982. This was based in large part upon research performed at the University of Maine at Orono. This inclusion was partly in response to interest from the regulated community, in alternative technology to allow development of properties with limiting features, which otherwise would have prohibited development.

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In October of 1988 peat systems were upgraded from experimental system status to general use status. Appendix C of the Rules provided a fairly technical set of design and installation criteria for peat systems.

However, Appendix C also advised in a distinctly non-technical manner, that proper compaction levels can be achieved “... by an adult walking on (the peat) with snowshoes...” to reach a predetermined density of 6.2 to 9.4 pounds/cubic foot.



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In the summer of 1996, the Department of Human Services, Bureau of Health, Division of Environmental Health (DEH) was made aware of an unusually high number of problematic peat systems in southern Maine.

Specifically, many peat systems which had malfunctioned prematurely were reported in and around Westbrook. These reported failures occurred generally within five years of commencement of use, some as soon as the first year.

In many of these instances, use of peat systems in regulated residential subdivisions was required by the Maine Department of Environmental Protection (MDEP) as a condition of approval, to mitigate potential off site transport of nitrogen compounds (principally nitrate nitrogen) to surface and ground water supplies.

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Initially, DEH staff conducted some preliminary site inspections, and attended several meetings with concerned homeowners and elected officials.

In response to Legislative concerns about new peat systems being installed without Departmental oversight, the DEH returned peat systems to experimental status requiring review and approval by the Program, in February of 1997, pending the results of an onsite assessment of the problem. No designs have been submitted for review since then.

Due to a critical staff shortage, this assessment did not begin until March of 1998, as part of a Legislative inquiry into requiring the Department to pay for replacement of peat systems.

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The efficacy of peat as a wastewater treatment medium, particularly from the perspective of nutrient and pathogen reduction, has been well documented by many researchers over the past 20-plus years, and was not the focus of this assessment.

Rather, the assessment focused on specific installations and the causes of specific malfunctions. Although it was not possible or practical for DEH to inspect each of the reported installations, every effort was made to ensure that a representative number of systems were inspected.

All references to totals in this report are based upon the responses DEH received; there may be other systems of which DEH is not aware.

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Step 1: Identify the problem: Peat systems reported to be failing at a high rate.

Step 2: Quantify the problem.

Poll LPs, SEs, and contractors

Collate a list based upon survey results

Step 3: Investigate the problem.

Select sites for on site inspection

Inspect and document selected systems.

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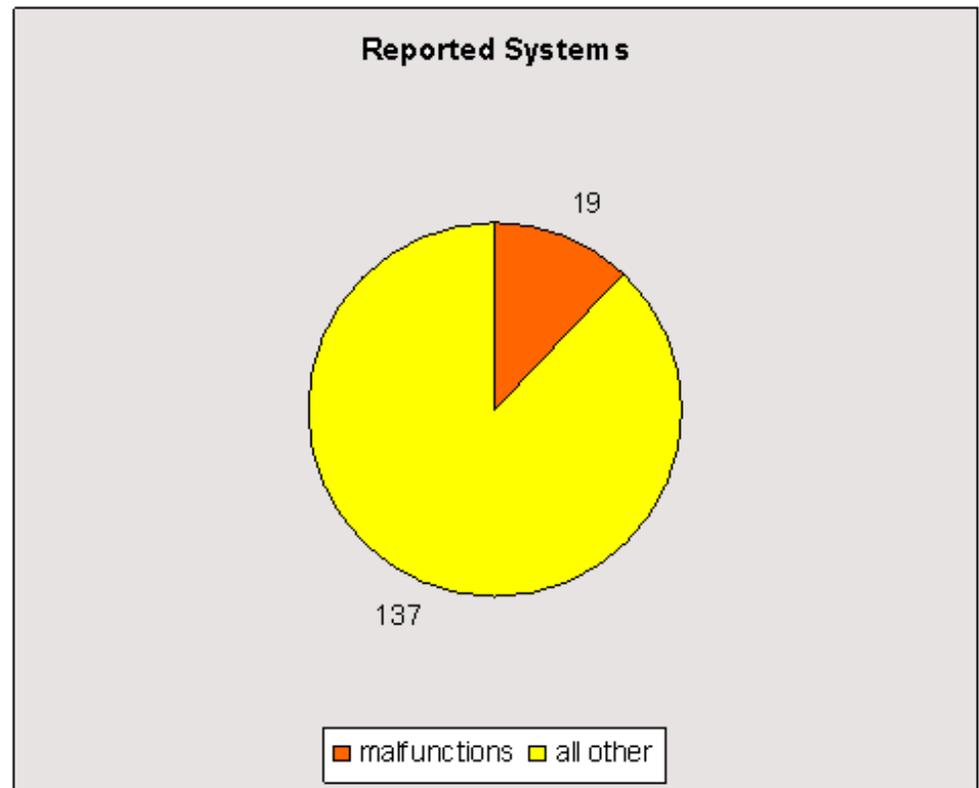
In March of 1998, DEH staff implemented an assessment of peat systems. The first step was to identify the locations and number of peat systems which had been installed.

To this end, the Program mailed questionnaires to all appointed Local Plumbing Inspectors in Maine, to licensed Site Evaluators via DEH's semi-annual newsletter, and to a list of developer contacts provided by MDEP staff.

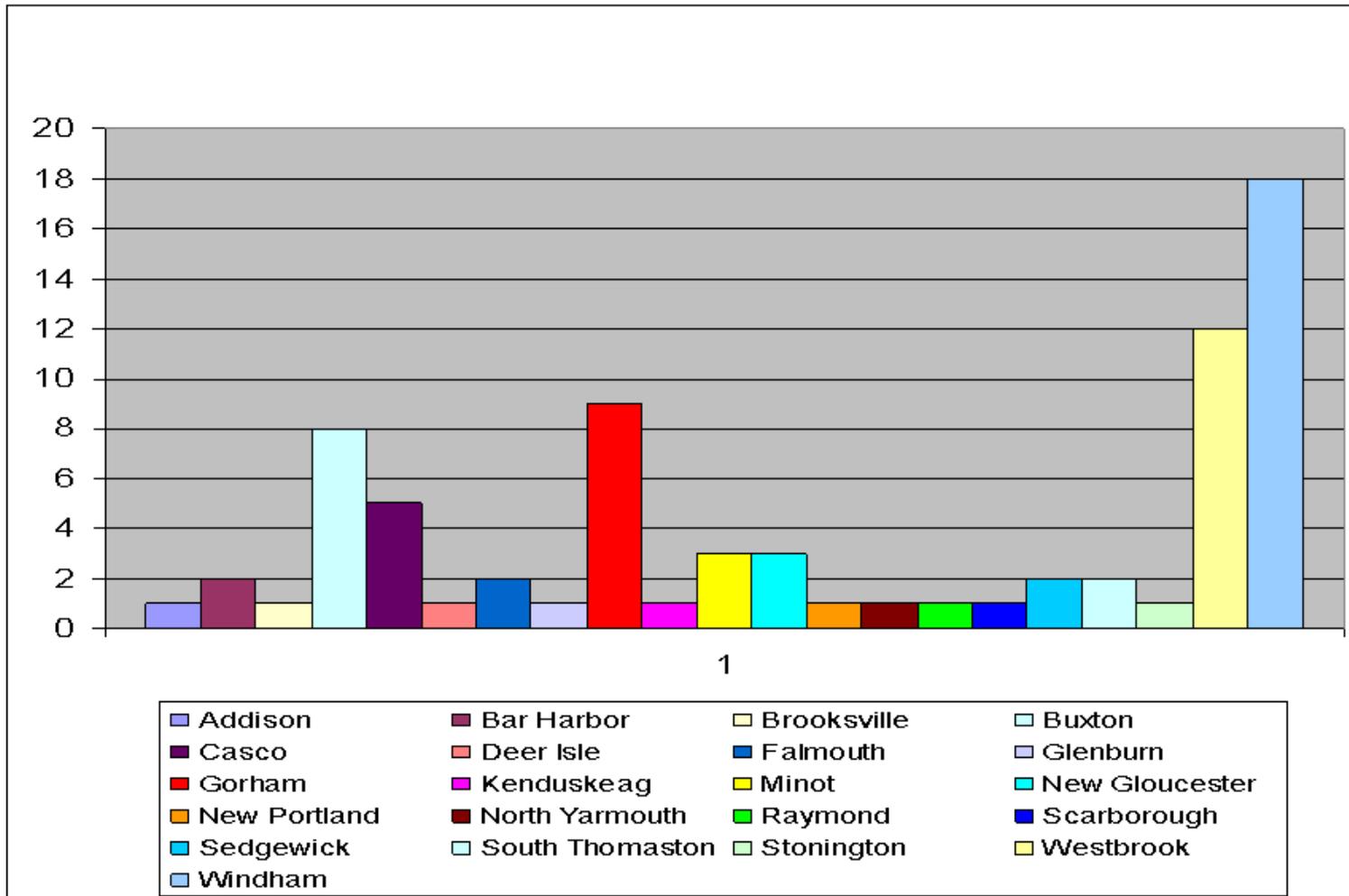
While the response rate from LPIs and SEs was very good, it was not total. Therefore, a list of sites which were not included in the responses was subsequently provided to DEH by Dr. Joan Brooks, UMO and the MDEP.

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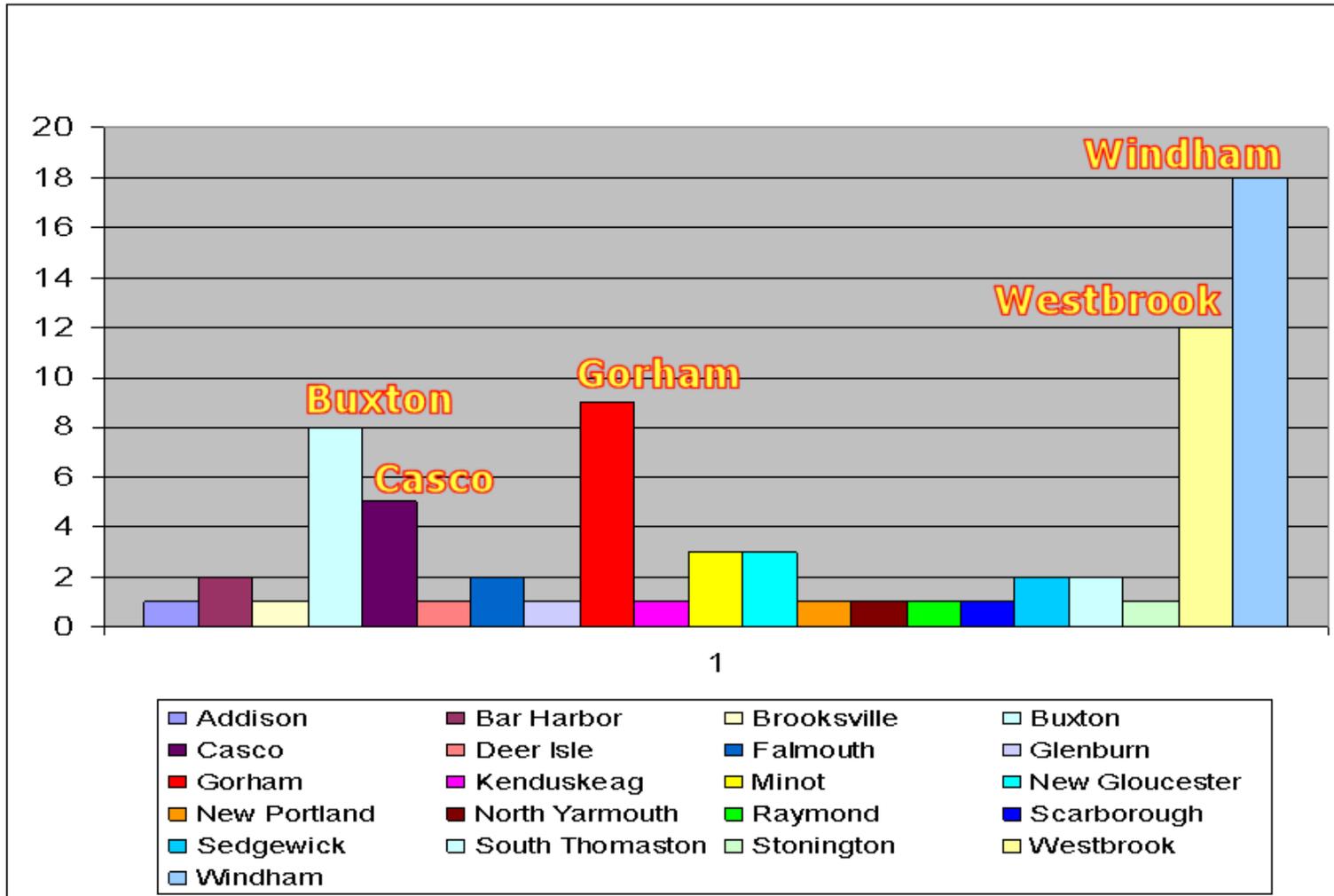
A total of 156 peat system installations were reported. After sorting through the responses, DEH staff developed a list of potential sites for inspection from the reported installations. These included sites which had no reported problems, as well as known malfunctions, to form a basis of comparison.



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Between May 11, 1998 and August 4, 1998, 68 of the 156 reported peat system installations were inspected.

Inspections consisted of questioning the homeowners (if present) about their use habits, a visual inspection of the property and siting, and a physical inspection of the actual peat system.

If the homeowners were not present, inspections were restricted to visual inspections only, for signs of malfunction, absent consent of the Local Plumbing Inspector.



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The physical inspections consisted of excavating one or more inspection pits in and adjacent to the peat bed, occasionally core or other materials sampling, and examination of the septic tank outlets and/or effluent distribution boxes when possible. Intrusive examinations were not conducted without owner permission.



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These systems mostly served single family dwelling units, with the following exceptions: one two-family apartment unit in Stockton Springs, and a large system serving the Cadillac Mountain Visitor Center at Acadia National Park. Of the peat systems inspected, all but manufactured module installations in Stockton Springs were built on site. The photo at right shows the Acadia national Park system.



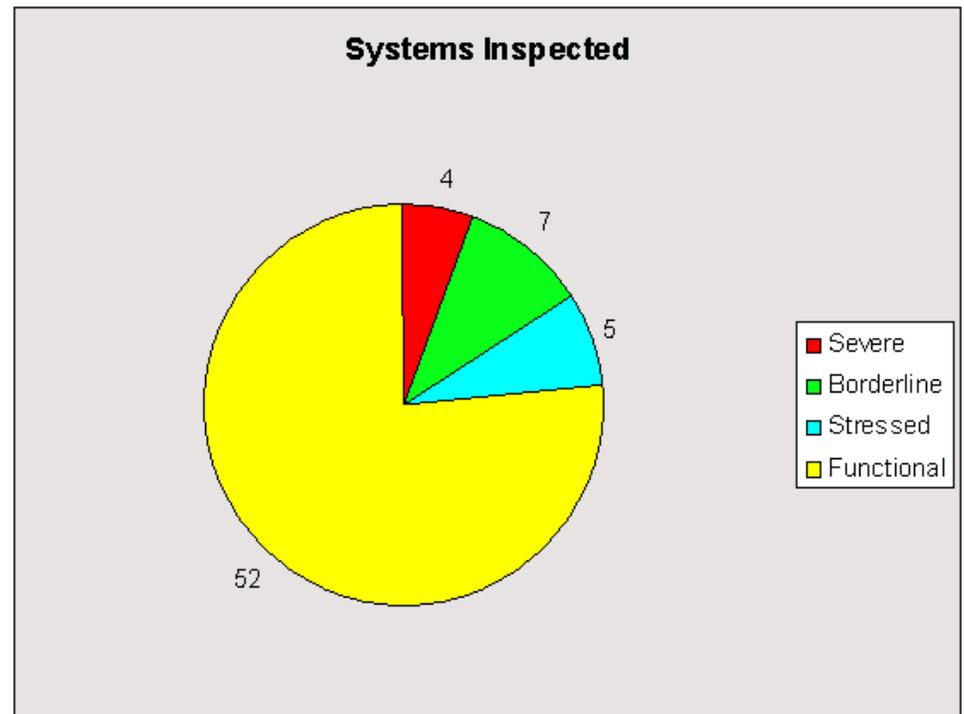
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These nonconforming installations included, in no particular order:

- over compaction of the peat media,**
- use of unapproved pipe bedding stone,**
- use of unapproved distribution pipe,**
- use of stone containing excessive fine particles,**
- use of stone exceeding the size criterion of the Rules,**
- use of excessively dry peat during construction,**
- unapproved use of alternating layers of peat and stone**
- total lack of pipe bedding stone,**
- covering the peat bed with soil or other materials and/or**
- use of garbage grinders contrary to designer recommendations.**

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Four of the inspected systems were severely malfunctioning. Seven systems were borderline malfunctions. Five systems were stressed, with little capacity for additional loading. Thus, 16 of the 68 inspected systems were technically malfunctioning. The remaining peat systems inspected were in fair to excellent condition. Further, 29 of the inspected systems were not installed in conformance with the Rules, to varying degrees of severity.



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Lack of owner maintenance was observed at several sites, evidenced by a proliferation of woody shrubs and small trees in the peat beds, contrary to generally accepted practice for any type of disposal area. An extreme example of this observation is the system at right, which was functioning well despite the presence of numerous saplings and shrubs in the peat medium.



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In the majority of inspected malfunctions where the information was available, it appears that designer oversight of the installations was either on an intermittent "spot check" basis, or upon completion of the installation. In the majority of the observed properly functioning systems, it appears that the designer provided oversight of the peat system installations during most of the installation process.

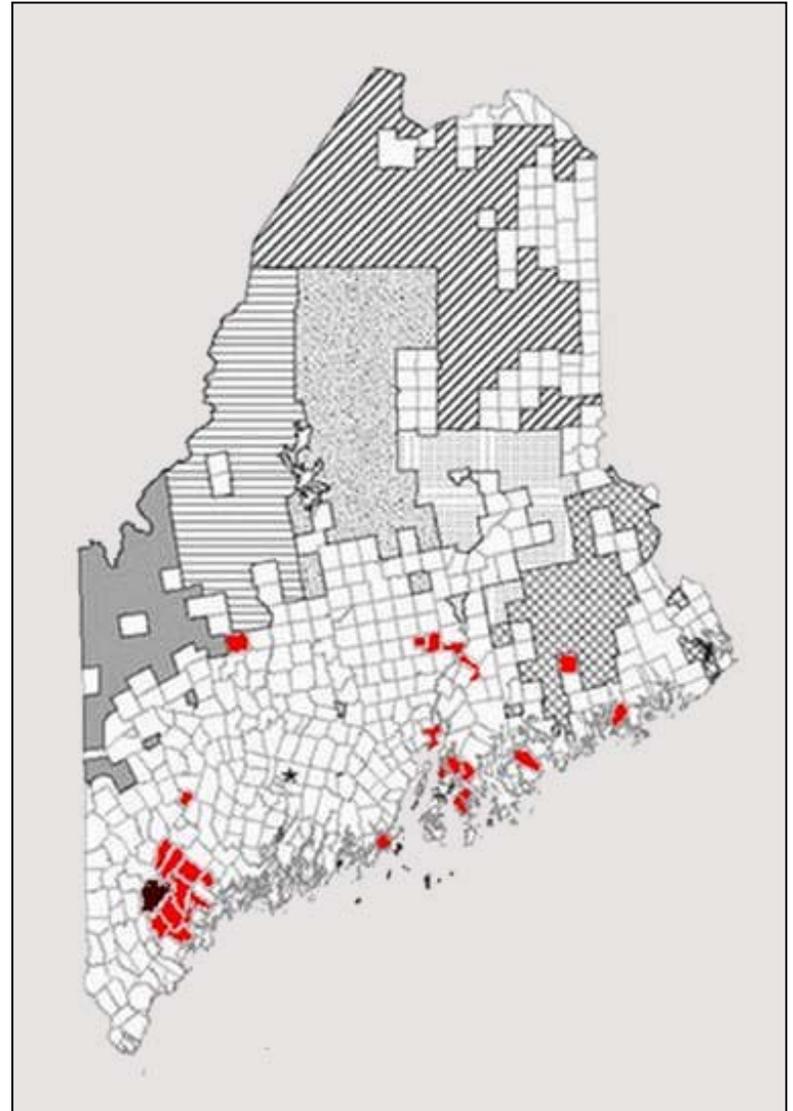


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The overwhelming majority of site-built malfunctioning peat systems were located in the communities in eastern Cumberland County.

It is also in these communities that the largest number of non-conforming installations were found, including the systems with layered stone and peat.

Of particular note, those systems which were found to have alternating layers of stone and peat, clearly not in conformance with the specifications in the Rules, were all located in this area.



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Findings and Conclusions

The installations which included a high level of designer oversight of the installation process, also are those which were found to be in the best physical and operating condition. In fact, the eight year old system in Windham previously noted received such oversight and it continues to function well, even though it had been neglected in terms of bed maintenance. This trend strongly suggests that designer oversight during installation is beneficial, perhaps necessary.

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Findings and Conclusions

DEH erred by failing to include easily understood peat system installation guidelines for installers. Peat systems are a complex proposal, with which most sewage disposal system installers are not familiar. The guidelines therefore should have been easily understood by the average sewage disposal system installer, and separate from the technically oriented design criteria within the Rules. The Rules' colloquial instructions for compacting the peat beds by snowshoeing on them may have been well intentioned, but none the less, this was hardly a scientific or consistently interpreted standard.

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Findings and Conclusions

Onsite peat sewage treatment systems can work well, if properly designed, installed, and maintained. DEH is persuaded that the systems inspected included a sufficient number of functioning systems to attest to this.

However, the design and installation quality appears to be both critical to the success or failure of an individual system, and much more sensitive to errors than conventional systems.

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Findings and Conclusions

Lack of standardized qualifications for onsite sewage disposal system installers generally impedes efforts to assure consistent quality of onsite sewage disposal system installations statewide, but this was much more evident in peat system installations due to the greater sensitivity of these systems to installation error.

Lack of owner maintenance appears to be a secondary contributory factor to the malfunctions compared to improper installation, in some cases.

Contact Information

<http://www.maine.gov/dhhs/eng/plumb/index.htm>

The screenshot displays a Mozilla Firefox browser window with the URL <http://www.maine.gov/dhhs/eng/plumb/index.htm>. The page header includes the Maine.gov logo and navigation links for Agencies, Online Services, Web Policies, and Help. The main content area features a banner for the Division of Environmental Health, Subsurface Wastewater Program, State of Maine, with a search bar for SWP and a Site Map link. The page is organized into three columns: PROGRAM INFORMATION, main content, and FEATURED LINKS. The PROGRAM INFORMATION column lists links for About Us, Forms, Links, Lists, Newsletters, Policies, Publications, and Training. The main content area contains a welcome message, mission statement, and news updates. The FEATURED LINKS column lists various online services and resources.

PROGRAM INFORMATION

- About Us
- Forms
- Links
- Lists
- Newsletters
- Policies
- Publications
- Training

Welcome to the Subsurface Wastewater Program

Our Mission: To minimize health and safety hazards associated with improperly installed subsurface waste water disposal systems.

Maine is a predominantly rural state, and relies heavily on decentralized sewage disposal facilities for disposal of human waste, i.e., onsite sewage disposal systems. The State of Maine has regulated onsite sewage disposal since 1926, to varying degrees. Over the years, the Maine State Plumbing Code, Subsurface Wastewater Disposal Rules (Rules) in their various iterations have been promulgated by the Maine Center for Disease Control and Prevention (MCDCP) and its antecedents.

The MCDCP has been, and continues to be, responsible for the Rules because they have historically been viewed as a public health code, rather than an environmental regulation. The Subsurface Wastewater Program within the MCDCP's Division of Environmental Health is the program which promulgates and administers the Rules.

What's New at the Subsurface Wastewater Program

YOWA 2007 Elections

Russ Martin and Jim Jacobsen have been elected to the Board of Directors, for the Yankee Onsite Wastewater Association (YOWA). YOWA is the professional leadership organization for the onsite industry in New England. It is the official northeast affiliate of the National Onsite Wastewater Recycling Association (NOWRA).

New Products

Several products have been approved for use in Maine, or have received revised approvals, in 2006. To view a list of these products, please click on this link.

FEATURED LINKS

- Online Rules
- Variations
- Site Evaluator Licensing
- Frequently Asked Questions
- Ten Tips for Systems
- Cemetery Registration
- Certifications
- Public Swimming Pools

ONLINE SERVICES

- Publications Order Form
- Permit Labels & Forms
- Record Search Form
- Water Records Spreadsheet
- Map and Directions
- Feedback Form

Contact Information

Program Staff

- **James Jacobsen, Project Reviews, Webmaster 287-5695**
- **Douglas Coombs, LSE, Site Evaluation Program 592-2084**
- **Brent Lawson, State Plumbing Inspector 592-7376**
- **Wendy Austin, Plumbing Permits & Data Entry 287-5672**
- **Lorraine Martin, Permits and Program Support 287-5689**