

**Implementing the Upper
Maple River Watershed Plan:**
*Approaches to Decrease Environmental and
Public Health Risks from Failing Well and Septic Systems*

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Clinton Conservation District
St. Johns, Michigan

Prepared by

Public Sector Consultants Inc.
Lansing, Michigan
www.pscinc.com

In Coordination with

Well and Septic Stakeholder Committee

and

Mid-Michigan District Health Department
St. Johns, Michigan

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This report was developed with the guidance, thoughtful input, and discussion of members of the Well and Septic Stakeholder Committee representing a variety of diverse interests from Clinton, Gratiot, and Montcalm counties. The committee met on five occasions between April and June 2014 at the offices of Agro-Culture Liquid Fertilizers Inc., located in St. Johns, Michigan.

Committee Members

- Brian Denman, Gratiot County Drain Commissioner
- Nathan Foote, Health Services Expeditors
- Ben Foster, Foster Trenching
- Phil Hanses, Clinton County Drain Commissioner
- Olan Humm, Humm Farm
- Tim Jandernoa, Jandernoa Water Systems, Inc.
- Laurie Koelling, Tomie Raines, Inc., and the Michigan Association of Realtors
- Joe Latoff, Friends of the Maple River
- John Pohl, Rainbow Lake Association
- Don Potts, Don's Contracting
- Julie Spencer, Gratiot Conservation District
- Jim Vanas, Montcalm Association of Realtors
- Rob West, Clinton County Farm Bureau

Ex Officio Members

County Commissioners

- Jack Enderle, Clinton County Board of Commissioners and Board of Health Member

Project Partners

Clinton Conservation District Staff

- John Switzer, Executive Director
- Paige Filice, Watershed Coordinator

Mid-Michigan District Health Department Staff

- Marcus Cheatham, Health Officer
- Bob Gouin, Environmental Health Director

Public Sector Consultants Staff

- Mark Coscarelli, Vice President
- Jon Beard, Consultant

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Executive Summary

In 2010, a watershed management plan was completed for the Upper Maple River that documented land use and environmental conditions in the watershed, identified sources and causes of pollution, and developed a strategy to support a healthier environment, while maintaining social and economic viability in the region.

Within the watershed, high levels of *E. coli* bacteria have been documented in various portions of the river and its tributaries. The Clinton Conservation District, in collaboration with other public and private organizations, is working to address pollution sources through the implementation of best management practices identified in the watershed management plan. The plan also recommended assessing the impact of on-site wastewater treatment systems on water quality, and seeking stakeholder input on sensible policies, guidelines, and strategies to reduce nutrient and bacteria inputs and improve water quality.

After considering local environmental conditions and the recommendations of the watershed management plan, the Conservation District approached the Mid-Michigan District Health Department (MMDHD) to discuss on-site wastewater treatment systems within the watershed. As a result, the Conservation District and the MMDHD agreed to convene a stakeholder committee to further evaluate the potential environmental and public health effects of well and septic systems. The committee also was charged with developing recommendations that would reduce public and environmental health risks associated with failing systems for consideration by the MMDHD Board of Health.

To better understand the extent of on-site wastewater treatment systems within Clinton, Gratiot, and Montcalm counties, Public Sector Consultants Inc. (PSC) had previously conducted analysis to estimate the number of households serviced by on-site and community systems. Using information available from the 2010 census, the Michigan Department of Environmental Quality (MDEQ), and local jurisdictions, PSC estimated that approximately 58 percent of homes, or 43,277, are serviced by an on-site system, while 42 percent, or 31,978 homes, are serviced by a community system.

While many homeowners conduct routine maintenance of their on-site systems, failures still occur. Using a national estimated failure rate of 10 percent and a 25 percent failure rate documented by the Barry–Eaton Health Department for a range, it can be estimated that there are between 4,328 and 10,819 failing systems in Clinton, Gratiot, and Montcalm counties. Within this range, it is difficult to know how many sites have no drain field and are considered illicit connections that may be discharging directly to a public drain or body of water.

The 14-member committee, representing diverse interests from the three counties, met five times between April and June 2014. The first three committee meetings were focused around sharing information and discussion to help develop a common understanding of issues relating to water quality in the three counties, the potential health and environmental impacts of on-site systems, current well and septic regulations, basic well and septic system function and maintenance approaches, educational strategies to enhance homeowner awareness, current inspection methods during property transactions, and varying points of view regarding well and septic system management. Committee members completed an online survey to better understand the opinions and perceptions of the group. The survey was developed to help foster discussion and identify areas of consensus among committee members. Responses were collected anonymously to encourage members to comment freely. The fourth committee meeting focused on the development of guiding principles and recommendations. The guiding principles were utilized to help facilitate recommendations among diverse stakeholders by identifying shared values and clarifying what is most important. At the final meeting, the committee reviewed a draft final report and completed its recommendations to the Board of Health.

Challenges and Potential Solutions

The committee agreed that many homeowners lack basic knowledge regarding the operation and maintenance of septic systems. For example, most homeowners are unaware that a septic tank should be pumped on a regular basis (i.e., every 5 to 7 years) to avoid premature failure of a system. In addition, some homeowners may be unaware that their septic tank has a direct connection (i.e., illicit discharge) to a county drain or other waterway, which could pose a serious public health threat. One potential solution discussed by the committee was effective education and outreach strategies that encourage homeowners to properly maintain on-site systems. Based upon a review of other counties and states, these efforts usually include an owner inventory of well and septic systems, a data set maintained by the local health department, and programs in which property owners are sent periodic reminders to educate them about their systems and encourage proper maintenance. These programs may also include homeowner workshops. Following extensive discussion, the committee concluded that while educational approaches are helpful and would likely reduce failure rates, they would not fully address the problem of failing systems, particularly illicit discharges. The group also noted that education, while valuable, must be more than a one-time activity and needs to be ongoing to remain an effective strategy. Another potential solution that was discussed was a time-of-sale inspection program (TOS), which has been adopted in varying forms in at least 12 Michigan counties. These inspections are mandated and normally occur during a real estate transaction. While requirements of these ordinances vary by jurisdiction, they generally share common elements. In these jurisdictions, on-site systems must be inspected when a home is sold. If an on-site system is determined to be “failing,” it must be brought up to code, or have a corrective action plan in place before the transaction can be completed. In many jurisdictions, these ordinances have included what some consider to be a far-reaching definition of “failure,” encompassing minor system elements (e.g., having a sump pump or water softener connected to the septic system) that pose a low risk to public or environmental health. Additionally, Realtors and homeowners have noted that these requirements can come at high cost to correct minor problems and slow or prevent property transactions. The committee discussed these approaches at length and agreed that the potential challenges identified by the real estate community, service providers, and the Health Department make these standard TOS programs undesirable.

On the other hand, the committee agreed that if the identified challenges of existing TOS programs could be overcome, then a program administered by the Health Department could be extremely effective. The committee discussed a program that would overcome those challenges by improving information management at the Health Department, enhancing educational activities, and developing an innovative, risk-based ordinance that would share results of inspections that occur when homes are sold with the Health Department without slowing or preventing a transaction. The approach also would use a narrow definition of system failure (see pages 6-7) when identifying properties in need of upgrades. Such an approach would address concerns of stakeholders and reduce the number of failing systems that pose a high risk to public and environmental health.

Committee Recommendations

After thoughtful discussion and consideration, the committee reached consensus¹ regarding steps the Health Department, the Conservation District, and other community partners can take to decrease the public and environmental health risks of failing on-site systems, which are provided below.

1. The Health Department should seek funding to digitize well and septic records and make them available online. The goal for the Health Department would be to maintain a database of all properties that are not connected to a community system in its jurisdiction.

¹ For the Well and Septic Committee, consensus is considered a supermajority of members. One committee member representing the Montcalm Association of Realtors disapproved of portions of the recommendations. The member expressed opposition to any new ordinance or government regulation. The member was supportive of educational approaches to encourage homeowners to proactively maintain their on-site systems.

Rationale: Developing an online database of well and septic records will provide information to homeowners, home buyers, Realtors, and service providers in a streamlined manner. Once developed, this database could also be used to identify homes not serviced by community systems that do not have any well or septic permits on file for targeted outreach efforts.

2. The Health Department should work with community partners such as the Conservation District; County drain commissioners; municipal building officials and tax assessors; and service providers to digitize and provide geographic information system (GIS) overlays and other digital information (i.e., contamination sites, county drain systems) to better inform the public.

Rationale: Access to relevant GIS data will help the Health Department, drain commissioners, and service providers better protect public health by ensuring that well and septic systems are sited away from potential health hazards and contaminant pathways (e.g., underground storage tanks and county drains).

3. Recognizing the importance of an informed citizenry, the Health Department, in collaboration with regional partners such as the Conservation District and service providers, should develop and implement an education and outreach initiative to encourage homeowners and residents to proactively maintain their well and septic systems. These activities may include direct mailings and workshops.

Rationale: Drawing on information from the Licking County, Ohio, case study, and others, education and outreach programs have been shown to increase homeowner awareness and positively affect homeowner maintenance of on-site systems. These approaches are expected to decrease public health risks, but do not address the problem of identifying and fixing all failing systems, particularly illicit connections.

4. The Health Department, the Conservation District, and community partners should explore grant opportunities to support education and outreach efforts that would increase homeowner awareness of effective maintenance of on-site systems. Additionally, community partners should explore opportunities to fund these activities through public-private partnerships.

Rationale: Since waterways within Clinton, Gratiot, and Montcalm counties are identified as exceeding state and federal water quality standards for bacteria levels, the region may be eligible to receive grants from state and federal programs that seek to address water quality problems. Additionally, service providers may be interested in contributing to educational campaigns.

5. Current regulations appear to be adequate regarding the siting, installation, sizing, etc., of well and on-site disposal systems. However, recognizing that failing well and septic systems, particularly those septic systems with an illicit or direct connection and those that are poorly maintained, constitute an environmental and public health risk, the Health Department should consider adopting an innovative ordinance that incorporates a risk-based approach and requires inspection results to be shared with the Health Department without delaying or preventing property transactions from proceeding. Under the recommended approach, the Health Department would use a narrow definition of “system failure” (see pages 6-7) that would address failed systems with high risk to public health, such as those with illicit connections/direct discharges to surface waters or ponding on the surface. In other words, functional non-conforming systems that do not meet the Health Department’s current definition of failure would not be required to be upgraded to current code. The details of program mechanics and requirements would need to be developed and discussed further with stakeholders. A list of topics that may need to be discussed during program development and a working draft of a program flow chart is included in Appendix B.

Rationale: While educational approaches are expected to improve conditions and decrease public health risks associated with failing well and septic systems, they do not effectively identify failing systems and illicit connections. Since the majority of home transactions are completed with the assis-

tance of Realtors and include an inspection of well and septic systems, a program that shares inspection results with the Health Department in a timely manner without delaying home transactions would provide a mechanism to ensure occupied houses have non-failing systems. Using a narrow definition of failure would address properties that pose a high risk to public health while grandfathering in older systems that still remove pathogens from the environment, but may not perfectly meet current installation requirements. Specific requirements and program components would need to be developed. Input from service providers, homeowners, lenders, and other community partners is necessary to develop a program that would be effective in Clinton, Gratiot, and Montcalm counties.

6. The Health Department should continue to evaluate the costs and funding approaches of implementing such a program, with the goal of developing a sustainable and efficient funding mechanism that minimizes the economic burden to homeowners and the Health Department.

Rationale: The Health Department will need to develop an estimated cost for implementing such a program and a funding model that ensures it can be operated sustainably, effectively and consistently. Funding opportunities for evaluation include grants, public-private partnerships, fee-for-service, and other approaches.

7. The Health Department, in collaboration with community partners, should develop and implement an education campaign before, during, and after the program is implemented. The education campaign should increase awareness of program requirements among homeowners, Realtors, lenders, service providers and other stakeholders.

Rationale: For any new program to be effectively implemented community members will need to understand program requirements. Proactively engaging the community will increase awareness and effectiveness of the program.

These recommendations are based upon agreement by the committee that the Health Department has an opportunity to improve its information management systems, enhance educational activities, and develop an innovative, risk-based ordinance that would address high risk properties without impeding home sales, which could become a model for other counties in the state. This framework would address environmental health risks in Clinton, Gratiot, and Montcalm counties and respond to challenges and concerns raised by stakeholders.

Background

The Upper Maple River watershed is approximately 513 square miles and is located primarily within Clinton, and Gratiot counties, with portions extending into Ionia, Montcalm, and Shiawassee counties. The Upper Maple River watershed is a subsection of the Maple River watershed, a tributary to the Grand River.

In 2010, a watershed management plan was completed for the Upper Maple River that documented land use and environmental conditions in the watershed, identified sources and causes of pollution, and developed a strategy to support a healthier environment, while maintaining social and economic viability.

The watershed management plan documented that some waterways within the watershed do not meet water quality standards to support aquatic wildlife and a warmwater fishery. The watershed plan documents that all subwatersheds are threatened for total and partial body contact (e.g., swimming and boating) because of bacteria levels. The plan identifies known pollutants and sources, including sediment (overland runoff, streambank erosion, livestock access, and road crossings) and nutrients (overland runoff, manure applications, livestock lot runoff, fertilizer applications, and livestock access), as well as suspected pollutants and sources, including pathogens and bacteria (failing septic systems and illicit connections, manure applications, livestock lot runoff, livestock access, and wildlife) and pesticides and chemicals (cropland erosion).

Since the watershed management plan was completed, additional water quality monitoring was conducted in the watershed. A 2013 staff report from the MDEQ documented that *E. coli* levels at six sampling locations within the watershed consistently exceeded water quality standards in 2012. The sampling showed,

“Individual daily and 30-day geometric mean concentrations ranged from 85 to 3,902 and 211 to 512 E. coli/100 mL, respectively. All stations exceeded the 30-day geometric mean (130 E. coli/100 mL) and had at least 2 exceedances of the daily geometric mean (300 E. coli/100 mL) Total Body Contact standard. Maple River at Shepardsville and Nickel Plate Roads and Fish Creek at Fenwick Road exceeded the daily 5 geometric mean Total Body Contact standard on every sampling event.” (MDEQ, 2013).

These impairments are further documented in the 2014 Integrated Report, which the state is required to update and issue every two years under the federal Clean Water Act. The Integrated Report documents whether or not water bodies within the state meet water quality standards for protected uses of water resources (designated uses). The 2014 Integrated Report documents that many portions of the Maple River and its tributaries within Clinton, Gratiot, Montcalm, and Shiawassee counties have high levels of bacteria that exceed water quality standards (MDEQ, 2014).

The Conservation District, in partnership with many other public and private organizations, received a grant from the MDEQ to implement the watershed management plan and address these issues using best management practices. These include ongoing efforts to install cattle crossings and exclusion fencing, drainage water management systems and buffer strips, stream restoration, as well as outreach and education activities. The watershed plan recommended assessing the effects of on-site wastewater treatment systems on water quality, and seeking stakeholder input on sensible policies, guidelines, or strategies to reduce nutrient and bacteria inputs and improve water quality.

In 2013, the Conservation District approached the Mid-Michigan District Health Department, which includes Clinton, Gratiot, and Montcalm counties, to discuss on-site wastewater treatment systems within the watershed. The Health Department is a local government agency charged with protecting public and environmental health and oversees the installation of well and septic systems. After considering local environmental conditions and the recommendations of the watershed management plan, the Conservation District and the Board of Health agreed to convene a stakeholder committee to further evaluate the potential effects of well and septic systems and to develop recommendations that would reduce public and environmental health risks associated with failing systems for consideration by the MMDHD Board of Health.

EXISTING WELL AND SEPTIC REQUIREMENTS

Local health departments have regulatory authority over well and septic systems. Local health departments have more control over septic regulations than water well regulations, which are mandated by federal and state law and administered through local health departments. For local regulations to be adopted by the MMDHD, first the Board of Health must approve an ordinance, followed by each of the three member counties. Environmental health regulations were originally adopted in 1966 and went into effect in 1967. The regulations have been revised from time to time, including substantial revisions in 2001 and updates in 2012.

Septic System Requirements

Septic system regulations vary based on the use and type of system. Generally, smaller systems are governed by local regulations, while larger systems must meet state standards. The regulatory framework by system size and type is provided in Exhibit 1.

EXHIBIT 1. On-site Wastewater Treatment Systems Regulatory Framework

Category	Water use	Regulatory Framework
Residential sites	1,000 gpd or less	Local regulations
Small commercial	1,000 gpd or less	Local regulations following MDEQ requirements
Large commercial	1,000–10,000 gpd	MDEQ Criteria
Subdivisions/site condos	Not Applicable	MDEQ Criteria

SOURCE: PSC 2014 (using information provided by the MMDHD)

The MMDHD environmental health regulations require a conforming septic system for occupancy (including alternative systems); define “sewage failure”; outline permit requirements, system construction requirements, isolation distances, and sizing charts; and outline the mechanisms for enforcement, condemnation, appeals, and variances. There are currently four alternative sewage systems approved under the regulations (aerobic treatment units, sand filters, pressure systems, and geotextile sand filters). Alternative systems must pass state and local review; the Board of Health has the final approval.

The MMDHD defines sewage failure as:

“A sewage failure shall include but not be limited to any condition where effluent from any sewage absorption system is exposed to the surface of the ground or is permitted to drain on or to the surface of the ground, into any ditch, storm sewer, lake or stream, or

when odor, appearance, or presence of this material may have an obnoxious or detrimental effect on or to the senses and/or health of persons. A sewage absorption system is considered to have failed if any one of the following conditions exists:

- *The system does not accept effluent at the rate of application; or*
- *Sewage effluent seeps from, or ponds on or around the absorption system, or contaminates the surface and/or groundwaters; or,*
- *When the back-up of sewage effluent in a basement, indoor plumbing, or crawl space occurs.”*

Water Wells

The regulatory framework for water wells is markedly different than the framework for septic systems. For water wells, local health departments are tasked with implementing state and federal laws with specific requirements. Compared to septic system regulation, there is far less flexibility on local administration of the requirements for water wells.

The primary laws that currently govern water well installations include:

- Michigan Safe Drinking Water Act (Public Act 399 of 1976, as amended)
- Michigan Water Well Construction and Pump Installation Code (Part 127 of Public Act 368 of 1978, as amended)
- Michigan Natural Resource and Environmental Protection Act –(Public Act 451 of 1994, as amended)
- Federal rules addressing commercial water supplies
- Local regulations

These laws and rules detail several isolation districts (setbacks) from various potential health hazards. Examples include:

- 50 feet from septic tank, disposal field, dry well, sewage pump chamber, pressurized sewer, and animal/poultry operation
- 50 feet from a regulated underground storage tank (UST) or above-ground storage tank (AST) with secondary containment
- 50 feet from UST or AST and less than 1,100 gallons servicing the premises (e.g., home heating)
- 10 feet from buried gravity flow sewer, sump or pit, and surface water body
- 800 feet from work area of landfill or septage waste application
- 300 feet from subsurface injection of effluent/digested sludge, oil/gas wells, petroleum processing, and regulated AST or UST without secondary containment
- 150 feet from storage or prep area where chemicals might pollute soil or groundwater

Estimating the Number of On-site Systems

To better understand the extent of on-site systems in the area, the Conservation District asked PSC to estimate the number of households serviced by community wastewater treatment systems (CWTS) and on-site wastewater treatment systems (OWTS) within Clinton, Gratiot, and Montcalm counties. To develop the estimate, PSC used 2010 census data to identify the number of households within the counties; MDEQ data to identify community wastewater treatment systems; and information provided by individual jurisdictions to identify the number of households connected to a given wastewater treatment system. The following figures should be considered estimates designed to inform discussions of community health, which have an estimated margin of error of 5 percent or less. Within the three counties, an estimated 43,277, or 58 percent, of households are served by an on-site wastewater treatment system, while 31,978, or 42 percent, of households are served by a community wastewater treatment system. Figures for each county are provided in Exhibit 2 below. A summary of the methodology used to develop the estimates is provided in Appendix A.

EXHIBIT 2. Household Wastewater Treatment Services by Type

County	Total households (2010)	Estimated households served by OWTS	Estimated households served by CWTS	Percentage households served by OWTS	Percentage households served by CWTS
Clinton	30,695	14,979	15,716	49%	51%
Gratiot	16,339	8,808	7,531	54	46
Montcalm	28,221	19,490	8,731	69	31
Total	75,255	43,277	31,978	58%	42%

NOTES: OWTS: On-site wastewater treatment system; CWTS: Community wastewater treatment system

SOURCE: PSC using information from (1) 2010 census, available online:

<http://www.michigan.gov/cqi/0,4548,7-158-54534-252541--,00.html>; (2) Michigan Department of Environmental Quality: List of Active NPDES Permits, available online: http://www.michigan.gov/deq/0,4561,7-135-3313_3682_3713-10780--,00.html; and (3) individual jurisdictions within the Mid-Michigan District Health Department service area.

The U.S. Environmental Protection Agency (EPA) estimates the national failure rate of on-site systems at about 10 percent (EPA, 2013). The Barry-Eaton Health Department (BEDHD) found through its inspection program a failure rate of about 25 percent (BEDHD, 2014). Using these figures as low and high ends of a range, PSC estimated that between 4,328 and 10,819 on-site systems are failing within Clinton, Gratiot, and Montcalm counties. The estimated range by county is provided in Exhibit 3.

EXHIBIT 3. Estimated On-site System Failure Rates

	Estimated on-site systems	Failure rate	
		10%	25%
Clinton	14,979	1,498	3,745
Gratiot	8,808	881	2,202
Montcalm	19,490	1,949	4,873
Total	43,277	4,328	10,819

SOURCE: PSC 2014

The definition of “failure” can vary among jurisdictions and inspection programs. The Barry–Eaton Health Department includes what some may consider as minor problems within its definition of “failure” (e.g., connecting a water softener to the septic system). Other jurisdictions may define failure in a more limited manner. All definitions of system failure include illicit or direct connections in which household plumbing bypasses a drain field and discharges directly into agricultural tile drains or surface water bodies such as open ditches or creeks. Of all failures, households with illicit or direct connections may constitute the greatest public health risk.

The figures presented above do not draw any distinction between full-time residences and second homes. To determine if second homes would affect the estimated number of septic systems and failed systems, PSC checked the number of second homes identified in census data. This analysis showed a total of 3,418 second homes in the three counties. Assuming that the relative portion of households serviced by on-site and community systems remained constant for second homes, the estimates were adjusted to determine if there was a significant difference (see Exhibit 4).

EXHIBIT 4. Estimated On-site System Failure Rates, Adjusted for Second Homes

	Estimated on-site systems (all homes)	Adjusted estimate of homes with on-site systems (second homes removed)	Failure rate	
			10%	25%
Clinton	14,979	14,849	1,484.9	3,712.25
Gratiot	8,808	8,742	874.2	2,185.50
Montcalm	19,490	17,399	1,739.9	4,349.75
Total	43,277	40,990	4,099	10,247.50

SOURCE: PSC 2014

While removing second homes from the analysis decreased the estimate of total on-site systems and failing systems, the results did not change significantly. Under both scenarios (including vs. excluding second homes) the estimated number of failing systems is between 4,000 and 10,500.

Well and Septic Stakeholder Committee

The MMDHD and the Conservation District formed a Well and Septic Stakeholder Committee representing interests from the three counties to assess prevailing opinions and perceptions of water quality conditions within Clinton, Gratiot, and Montcalm counties, identify methods to increase awareness of proper well and septic system maintenance, and study approaches to decrease public and environmental health risks from failing systems.

EDUCATION AND OUTREACH STRATEGIES

At the request of committee members, PSC conducted research regarding effective education and outreach strategies that encourage homeowners to properly maintain on-site systems. Available information suggested that education and outreach approaches can be useful tools in areas of low environmental risk such as regions with low population densities and those not near bodies of water.

Effective education and outreach programs usually include an inventory of well and septic systems which is maintained by the local health department. Property owners with an on-site system are sent periodic maintenance reminders to educate them about their systems and encourage proper maintenance. These programs frequently include homeowner workshops (EPA, 2012).

Common characteristics of these programs include:

- Relative ease of implementation
- Lower administrative requirements
- Informative for local and regional planning efforts
- No additional compliance mechanisms
- Limited ability to review and inspect
- Continue to be dependent on homeowners for operations and maintenance

The committee reviewed a case study of an education program carried out in Licking County, Ohio. The county had about 23,000 homes not serviced by a community wastewater treatment system. Through funding provided by the state, the county sent a mailing to 10,000 homes with on-site systems. The mailing included a questionnaire to collect information about how homeowners were maintaining their systems. The county expected a response rate of about 10 percent; however the response rate was 27 percent. The program included homeowner workshops, which were attended by about 75 people. Following the educational campaign, the Licking County Health Department contacted the top five septic pumpers in the region; all of which reported an increase in calls from homeowners. The case study did not include information about how much of an increase occurred (EPA, 2012).

Committee members discussed the effectiveness of Licking County's campaign. Of the 23,000 homes with on-site systems, the county contacted 10,000, representing 43 percent of homeowners. Of the total homeowners, about 12 percent responded to the questionnaire and less than 1 percent participated in the workshops. Committee members agreed that it was likely that homeowners who knowingly discharged wastewater with illicit connections were less likely to engage in the process. After discussing the approach used by Licking County, the committee concluded that while the educational approaches are positive and would likely reduce failure rates, they would not solve the problem of failing systems. Furthermore, the group noted that education needs to be ongoing to remain an effective strategy to encourage maintenance. Committee members noted there may be opportunities for the private sector to partner with the Health Department or the Conservation District to fund an education effort, and that there may be grant opportunities available.

CURRENT WELL AND SEPTIC SYSTEM REVIEW PROCESS DURING PROPERTY TRANSACTIONS

Committee members representing Realtors and licensed system inspectors presented information to the group regarding the current well and septic system review process when property transactions occur in Clinton, Gratiot, and Montcalm counties. Under the status quo, when properties with on-site systems are sold through the assistance of Realtors, the buyer’s agent will recommend to the client that an inspection should be completed. In almost all circumstances, the prospective buyer follows the recommendation and completes an inspection through a third-party service provider. Between 85 percent and 90 percent of property transactions are completed with the assistance of Realtors. The remaining 10 percent to 15 percent are listed as “for sale by owner,” or may not be advertised at all, as is sometimes the case with agricultural homesteads and transfers within families.

In situations in which a well or septic system is determined to be deficient, or missing, the buyer and seller will generally negotiate to have the system repaired or decrease the purchase price of the home. However, transactions can still proceed, depending on lender requirements, without operable systems. Additionally, there is no mechanism that ensures the Health Department is informed of failing systems.

Committee members representing system inspectors reviewed the process used when conducting an inspection of on-site wastewater treatment systems and water wells. The inspectors emphasized the importance of easy and quick access to relevant information online (e.g., prior permits, as-built sketches). While individual inspectors may take different approaches, the inspections generally include the following:

- Collect information about the property through online sources such as assessing records, health department records, and well log records.
- Coordinate with the local health department to obtain all available records on the subject property.
- When on-site, evaluate the topography and soil type.
- Determine and evaluate the fuel source relative to location of the well.
- Turn on all the water in the house.
- Evaluate the well construction.
- Document the condition of systems that may affect the septic system (e.g., water softener, sump pump, etc.).
- Develop a drawing of tank field, structure location, property lines, etc.
- Determine whether or not the tank has been pumped within the last three years. If it has been pumped, open the tank and inspect its integrity. If it has not been pumped within the previous three years, arrange for pumping. The septic pumper will check the integrity of the tank, which is incorporated into the final report.
- Hand auger at least two borings to determine system and stone depth and condition.
- Findings of the inspection are summarized in a report and submitted to the client.

Committee members discussed how the Health Department handles situations in which an existing home with a failing system has site conditions that do not allow for installation of a system conforming with current codes. This situation can occur when a property owner discovers the system to be deficient and files for a permit to install a new system, or in instances where a failing system (such as a direct discharge) is identified through other means (i.e., a neighbor). Health Department staff members do their best to work with homeowners to install a functioning on-site system through a variance. This approach has led to a few instances where systems conform with the spirit of the regulation, while allowing people

to remain in their homes. Committee members agreed that this flexibility and collaborative nature from the Health Department are of high importance.

WELL AND SEPTIC MAINTENANCE AND COUNTY DRAINS

The committee discussed the interaction between well and septic systems and county drains. The Clinton County drain commissioner made a presentation to reflect the typical situation found by the respective drain offices in Clinton, Gratiot, and Montcalm counties. In Clinton County, it is estimated that there are more than 630 county drainage districts consisting of nearly 760 miles of open ditches and nearly 270 miles of enclosed drains. The Clinton County Drain Office has maps of most drains available online, which could be made available to the Health Department. The Clinton County drain commissioner noted that the Drain Office does not regularly deal with well and septic systems, as the office is charged with maintaining the county drainage system. The Drain Code prohibits the discharge of sewage into county drains. Occasionally, Drain Office staff members or contractors identify illicit discharges; when they are found, they work with the Health Department to resolve the matter as direct discharges become more of a public issue. Generally, the Clinton County Drain Office identifies about five direct discharges each year.

COMMITTEE MEMBER SURVEY

To better understand the opinions and perceptions of committee members, an online survey was developed to help foster discussion and identify areas of consensus among committee members. Responses were collected anonymously to encourage members to comment freely. Committee members were asked to respond to the following questions:

- Do current well and septic requirements adequately protect, overly protect, or inadequately protect public health and the environment?
- What public health and/or environmental concerns and issues should be considered related to well and septic regulations?
- What is the relative importance of addressing failing wells and septic systems compared to other contemporary environmental challenges identified in the Upper Maple River watershed management plan?
- What are economic consequences that should be considered related to existing well and septic regulations or future changes?
- What is the proper role of government in protecting public health?

The survey identified areas where there is consensus among the committee members, including:

- Health Department regulations appear to adequately protect public health for well and septic installation, but there are differing opinions on maintenance requirements after installation.
- The government has a responsibility to protect public health and minimize threats from failing septic systems, but approaches should be tempered by common sense and resource constraints and recognize costs relative to benefits.
- Committee members may view septic systems as a smaller component than other pollution sources in the watershed, but it was noted that the agricultural community may be unfairly singled out. Illicit discharges and direct connections should be addressed.
- Illicit discharges and direct connections are recognized by committee members as a threat to public and environmental health.
- There is strong support for efforts to encourage homeowners and residents to properly maintain on-site systems.

- There doesn't seem to be support for a full point of sale program that requires inspections and conformance prior to completion of a property transaction, but there is support for a limited risk-based approach that does not slow or prevent property transactions.
- The strength of the relationship between the Health Department and service providers is important. The Health Department should maintain a collaborative approach that allows for flexibility given site conditions.

GUIDING PRINCIPLES

Following discussion at the first three committee meeting and the results of the survey, the committee developed guiding principles that articulated the shared values and ideas of the group by identifying what is most important. These guiding principles were then utilized collectively to help evaluate recommendations to the Board of Health. The committee adopted the following guiding principles:

- The Health Department has a responsibility to protect public health and the environment and minimize risks associated with unacceptable exposures.
- Failed wells and septic systems fall under the purview of the Health Department, which has a legal mandate and responsibility to assist residents to ensure compliance with existing regulations.
- Failing well and septic systems, especially septic systems with an illicit or direct connection, constitute an environmental and public health risk that should be addressed.
- While educational efforts to increase homeowner awareness of effective well and septic system maintenance would likely have a positive effect on system failure rates, these efforts alone are not likely to address the range of existing problems (e.g., illicit or direct connections).
- Solutions to identified problems should be tempered by common sense and strike a balance between decreasing risks and economic costs borne by government, local communities, and individuals.
- The Health Department should maintain and enhance its collaborative relationships with service providers and residents as it regulates well and septic systems.
- The Health Department should establish criteria and measure the effectiveness of risk reduction activities over time.

RECOMMENDATIONS

The committee reviewed draft recommendations to the Board of Health at its fourth and fifth meetings. The committee discussed multiple approaches to better address well and septic system management to decrease failure rates and public and environmental health risks. Approaches the committee discussed included education campaigns, updating record management systems, an ordinance requiring results of on-site system inspections that occur when homes are sold to be shared with the Health Department, and requiring renewable operating permits for all on-site systems. While the committee discussed multiple approaches, not all are included in the recommendations.

After thoughtful discussion and consideration, the committee reached consensus² regarding steps the Health Department, the Conservation District, and other community partners can take to decrease the public and environmental health risks of failing on-site systems, which are provided below.

² For the Well and Septic Committee consensus is considered a supermajority of members. One committee member representing the Montcalm Association of Realtors disapproved of portions of the recommendations. The member expressed opposition to any new ordinance or government regulation that would be passed by the Health Department. The member was supportive of educational approaches to encourage homeowners to proactively maintain their on-site systems.

1. The Health Department should seek funding to digitize well and septic records and make them available online. The goal for the Health Department would be to maintain a database of all properties that are not connected to a community system in its jurisdiction.

Rationale: Developing an online database of well and septic records will provide information to homeowners, home buyers, Realtors, and service providers in a streamlined manner. Once developed, this database could also be used to identify homes not serviced by community systems that do not have any well or septic permits on file for targeted outreach efforts.

2. The Health Department should work with community partners such as the Conservation District; County drain commissioners; municipal building officials and tax assessors; and service providers to digitize and provide geographic information system (GIS) overlays and other digital information (i.e., contamination sites, county drain systems) to better inform the public.

Rationale: Access to relevant GIS data will help the Health Department, drain commissioners, and service providers better protect public health by ensuring that well and septic systems are sited away from potential health hazards and contaminant pathways (e.g., underground storage tanks and county drains).

3. Recognizing the importance of an informed citizenry, the Health Department, in collaboration with regional partners such as the Conservation District and service providers, should develop and implement an education and outreach initiative to encourage homeowners and residents to proactively maintain their well and septic systems. These activities may include direct mailings and workshops.

Rationale: Drawing on information from the Licking County, Ohio, case study, and others, education and outreach programs have been shown to increase homeowner awareness and positively affect homeowner maintenance of on-site systems. These approaches are expected to decrease public health risks, but do not address the problem of identifying and fixing failing systems, particularly illicit connections.

4. The Health Department, the Conservation District, and community partners should explore grant opportunities to support education and outreach efforts that would increase homeowner awareness of effective maintenance of on-site systems. Additionally, community partners should explore opportunities to fund these activities through public-private partnerships.

Rationale: Since waterways within Clinton, Gratiot, and Montcalm counties are identified as exceeding state and federal water quality standards for bacteria levels, the region may be eligible to receive grants from state and federal programs that seek to address water quality problems. Additionally, service providers may be interested in contributing to educational campaigns.

5. Current regulations appear to be adequate regarding the siting, installation, sizing, etc., of well and on-site disposal systems. However, recognizing that failing well and septic systems, particularly those septic systems with an illicit or direct connection and those that are poorly maintained, constitute an environmental and public health risk, the Health Department should consider adopting an innovative ordinance that incorporates a risk-based approach and requires inspection results to be shared with the Health Department without delaying or preventing property transactions from proceeding. Under the recommended approach, the Health Department would use a narrow definition of “system failure” (see pages 6-7) that would address failed systems with high risk to public health, such as those with illicit connections/direct discharges to surface waters or ponding on the surface. In other words, functional non-conforming systems that do not meet the Health Department’s current definition of failure would not be required to be upgraded to current code. The details of program mechanics and requirements would need to be developed and discussed further with stakeholders. A list of topics that may

need to be discussed during program development and a working draft of a program flow chart is included in Appendix B.

Rationale: While educational approaches are expected to improve conditions and decrease public health risks associated with failing well and septic systems, they do not effectively identify failing systems and illicit connections. Since the majority of home transactions are completed with the assistance of Realtors and include an inspection of well and septic systems, a program that shares inspection results with the Health Department in a timely manner without delaying home transactions would provide a mechanism to ensure occupied houses have non-failing systems. Using a narrow definition of failure would address properties that pose a high risk to public health while grandfathering in older systems that still remove pathogens from the environment but may not perfectly meet current installation requirements. Specific requirements and program components would need to be developed. Input from service providers, homeowners, lenders, and other community partners is necessary to develop a program that would be effective in Clinton, Gratiot, and Montcalm counties.

6. The Health Department should continue to evaluate the costs and funding approaches of implementing such a program, with the goal of developing a sustainable and efficient funding mechanism that minimizes the economic burden to homeowners and the Health Department.

Rationale: The Health Department will need to develop an estimated cost for implementing such a program and a funding model that ensures it can be operated sustainably, effectively and consistently. Funding opportunities for evaluation include grants, public-private partnerships, fee-for-service, and other approaches.

7. The Health Department, in collaboration with community partners, should develop and implement an education campaign before, during and after the program is implemented. The education campaign should increase awareness of program requirements among homeowners, Realtors, lenders, service providers, and other stakeholders.

Rationale: For any new program to be effectively implemented, community members will need to understand program requirements. Proactively engaging the community will increase awareness and effectiveness of the program.

Conclusion

Within the Upper Maple River watershed, high levels of *E. coli* bacteria have been documented in various portions of the river and its tributaries. The Clinton Conservation District, in collaboration with other public and private organizations is working to address pollution sources through the implementation of best management practices identified in the 2010 Upper Maple River watershed management plan. The plan recommended assessing the impact of on-site wastewater treatment systems on water quality, and seeking stakeholder input on sensible policies, guidelines and strategies to reduce nutrient and bacteria inputs to improve water quality.

The Conservation District approached the Mid-Michigan District Health Department to discuss on-site waste wastewater treatment systems in the watershed. As a result, the two organizations convened a group of stakeholders to further evaluate potential environmental and public health effects of well and septic systems.

After reviewing background information and environmental conditions within the watershed, the committee concluded that bacteria levels within the watershed are unacceptably high and that failing on-site systems, particularly illicit discharges, direct connections, and poorly maintained systems, are a source of contamination and remain a concern. The committee agreed that Health Department should take specific actions that would decrease public and environmental health risks associated with failing on-site systems within Clinton, Gratiot, and Montcalm counties. The recommendations developed by the committee are designed to be tempered by common sense and attempt to strike a balance between decreasing risk and economic costs borne by government, local communities, and individuals.

The Health Department has an opportunity to improve its information management systems, enhance educational activities and develop an innovative, risk-based ordinance that would address high risk properties without impeding home sales, which could become a model for other counties in the state. This framework would address environmental health risks in Clinton, Gratiot, and Montcalm counties and respond to challenges and concerns raised by stakeholders.

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Appendix A:

Household Wastewater Treatment Services by Type

PSC used 2010 census data to identify the number of households by jurisdiction within Clinton, Gratiot, and Montcalm counties; MDEQ data to identify community wastewater treatment systems; and information provided by individual jurisdictions to identify the number of households connected to a given wastewater treatment system. The following figures should be considered estimates designed to inform discussions of community health, which have an estimated margin of error of 5 percent or less. Within the three counties, an estimated 43,277, or 58 percent, of households are served by an on-site wastewater treatment system, while 31,978, or 42 percent, of households are served by a community wastewater treatment system. Figures for each county are provided in Exhibit A-1 below.

EXHIBIT A-1. Household Wastewater Treatment Services by Type

County	Total households (2010)	Estimated house- holds served by OWTS	Estimated house- holds served by CWTS	Percentage households served by OWTS	Percentage households served by CWTS
Clinton	30,695	14,979	15,716	49%	51%
Gratiot	16,339	8,808	7,531	54	46
Montcalm	28,221	19,490	8,731	69	31
Total	75,255	43,277	31,978	58%	42%

NOTES: OWTS: On-site wastewater treatment system; CWTS: Community wastewater treatment system

SOURCE: PSC using information from (1) 2010 census, available online:

<http://www.michigan.gov/cqi/0,4548,7-158-54534-252541--,00.html>; (2) Michigan Department of Environmental Quality: List of Active NPDES Permits, available online: http://www.michigan.gov/deq/0,4561,7-135-3313_3682_3713-10780--,00.html; and (3) individual jurisdictions within the Mid-Michigan District Health Department service area.

Methodology

- The total number of housing units was obtained from 2010 census data for each jurisdiction within Clinton, Gratiot, and Montcalm counties.
- Community wastewater treatment facilities are required to obtain a National Pollution Discharge Elimination System permit (NPDES) from the MDEQ. This includes all large-scale wastewater treatment plants that service cities, as well as small community systems, such as septic lagoons, that service small villages and mobile home parks. The MDEQ maintains an online database of all facilities that have been issued an NPDES permit; this is searchable by county. PSC reviewed all NPDES permits within Clinton, Gratiot, and Montcalm counties to identify each community wastewater treatment system.
- Once all wastewater treatment facilities were identified, PSC obtained and reviewed data to estimate the number of households served by each facility.
 - Most cities and villages with a community system were assumed to service every household in their jurisdiction. This assumption may overstate the number of households serviced by the community system. The City of St. Johns was contacted directly because it services portions of Bingham Township.
 - Community systems maintained by townships frequently service only portions of their jurisdiction. PSC called these townships to determine how many homes are connected to the community system.

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- Bath Township, the City of DeWitt, DeWitt Township, and Watertown Township are serviced by the Southern Clinton County Municipal Utilities Authority. PSC called each of these jurisdictions to determine how many homes are serviced by the community system.
 - A portion of the City of East Lansing extends into Clinton County. PSC called East Lansing to estimate how many homes are serviced by a community system.
 - In instances where a township representative was not available to provide an estimate, PSC contacted the county drain office to obtain an estimate.
 - Mobile home parks are frequently serviced by a community system, such as a septic lagoon. These systems are regulated by the MDEQ and assumed to be monitored. Household estimates in these areas were made by using aerial photography.
- PSC estimated the number of households serviced by an on-site wastewater treatment system by subtracting the number of households on a community wastewater treatment system from the total number of housing units in each county.
 - The census defines the number of households based on a total count of dwellings. Each unit within a multi-unit property is considered a household. Some multi-unit properties such as duplexes may share an on-site system.
 - This estimate does not include wastewater treatment systems that service businesses.

Appendix B:

Example Topics for Continued Discussion and Program Flow Chart

To successfully implement a limited time of sale program, the Health Department would need to develop program requirements and processes. The Health Department should continue to engage members of the committee and other community partners to develop such a program. Factors that would need to be considered and discussed further include, but are not limited to:

Electronic Interface:

- Public Interface
- Service Provider Access
- Exchange of Information/Document Sharing

Electronic Records:

- MMDHD Files—electronic and available
- Service Provider electronic submittal
- County Partners (i.e., Register of Deeds)—electronic record sharing
- System and Forms for Exchange of Information

Stakeholder Engagement:

- Realtors
- Lenders
- County Departments (i.e., Register of Deeds/Drain Commissioner)
- Service Providers/Evaluators
- Chamber of Commerce
- Agricultural Community
- Township Officials

Ordinance Language:

- MMDHD approval not required to complete property transactions
- Mandatory Evaluations
- Mandatory Report Filing and Acknowledgement of Receipt
- Exemptions
- Narrow Definition of Failure

Public Education Component:

- Common Message
- Target Audience (e.g., homeowners/residents, Realtors)
- Best Method of Delivery

- Outreach Approach for Program Rollout
- Outreach Approach for Education on Homeowner Maintenance

Program Metrics:

- Survey Stakeholders
- Demonstrate Public Health Impacts
- Evaluate Education Component/Homeowner Awareness
- *E. coli* Levels in Waterways
- Number of Systems Repaired

Certified Inspector:

- Reciprocity with neighboring LHDs
- Electronic Registration Process
- Training/Registration Process
- Quality Assurance/Quality Control

Required Resources:

- MMDHD Staffing
- MMDHD Costs (e.g., computer software/hardware, GIS)
- Fees for Service
- Use of Third-party Providers