KEHA Spring Newsletter 2018

Message From The President

Hello Members.

I would like to personally thank the Kansas Environmental Health Association (KEHA) Members for allowing me to serve as your 2018 KEHA President. In serving on the KEHA board the past four years, you become very appreciative of the hard work and dedication that goes along with accomplishing the KEHA objectives of the board. So, what really are the KEHA objectives?

The Objective of KEHA is to promote competency and effectiveness in sanitarians and other environmentalists engaged in the regulation of the Kansas environment including, but not limited to, food service establishments, commercial food preparation facilities, dairy product businesses, meat processing plants, bakeries, commercial lodging and hotels, swimming pools, water supplies, wastewater treatment and disposal, solid waste collection and disposal, air pollution control, radiation control, hazardous waste materials facilities, recreational camps and public events.

No big deal right! Actually, it's quite a bit of work to provide speakers and training opportunities for our members. This year is no different than any other year. We are fortunate to have some new members on the KEHA Board: Robert Torres, 2nd Vice President; Melissa Wilson, Secretary; and Ryan Witt, General Section Chair. I will mention that these new members are replacing some big shoes in the KEHA organization, Ann Mayo, Past President, Lisa Davies, Secretary, and Emma Tajchman, Special Section Chair. The KEHA board currently has a vacant Special Section Chair position, if someone would be interested in joining us.

I don't want to leave out the remaining board members, Guy Crabill, Past President, Tim Simons, 1st Vice President, Beth Rowlands, Treasurer and Tom Morey, Member-At-Large. I'm honored to serve as their president for the year.

So what should you expect this year? Our KEHA Spring Conference at the Bluemont Hotel in Manhattan, Kansas will be the first of many learning and networking opportunities for both new and veteran members of the organization. Please look at the spring newsletter, http://www.keha.us or Facebook https://www.facebook.com/www.keha.us/ for conference and speaker agenda information. KEHA will be offering scholarships for the spring conference. Please feel free to contact me at shawn.esterl@saline.org about the scholarship application for new or absentee conference attendees.

The KEHA recently conducted an outreach to the membership through the use of Survey-Monkey. The results of the survey are providing valuable information on where KEHA will go with upcoming activities. Robert Torres has been busy planning field training for soils class and alternative treatment systems class which will be in Pratt, Kansas. KEHA will also be providing school inspection training prior to our Fall Conference. KEHA is always actively looking at fall speakers and topics. Please forward suggestions to any board member.

I have hopes we can work with Kansas State University Engineering Extension and Research along with Kansas Department of Health and Environment with updating the Environmental Handbook, Bulletin 4-2 and KSU publications. I want to establish some short and long term goals for maintaining these essential documents. I'm also looking for individuals to help maintain these documents.

In closing I'm excited about the many activities we have scheduled this year. Please be sure to visit the KEHA website or catch up with us on FACEBOOK.

Shawn Esterl, President

2018 KEHA Board Members

President

- Shawn Esterl

Shawn.Esterl@saline.org

1st Vice President

- Tim Simons

Tim.Simons@snco.us

2nd Vice President

- Robert Torres

Rtorres@prattcounty.org

Secretary

- Melissa Wilson

Melissa.Wilson@jocogov.org

Treasurer

- Beth Rowlands

Beth.Rowlands@ks.gov

Past President

- Guy Crabill

GCrabill@franklincoks.org

Member At Large

- Tom Morey

Tom.Morey@ks.gov

General Section Chair

- Ryan Witt

Coweed@gbt.net

Special Section Chair

- Vacant

Training Course: Environmental Health Training in Emergency Response

The Centers for Disease Control and Prevention, in partnership with the Federal Emergency Management Association (FEMA), revamped their Environmental Health Training in Emergency Response (EHTER) course. EHTER helps prepare environmental health professionals and other emergency response personnel by providing them with the necessary knowledge, skills and resources to address the environmental health impacts of emergencies and disasters. Two different trainings are offered: EHTER Awareness Level and EHTER Operations Level.

EHTER Awareness Level is an online course that addresses the role of environmental health responders in preparing for, responding to and recovering from emergencies and disasters, including issues and challenges in disaster management, responder safety and health, safe water, food safety, wastewater, building assessments, vectors, pests and more.

EHTER Operations Level is an in-person course that trains participants to identify problems, hazards and risks, plan for team response; select appropriate equipment, perform required tasks using environmental health response protocols, and report and participate in follow—up activities is needed. Most of the course involves hands—on operation practice and response to simulated events. This in - person course is available through a partnership with FEMA. FEMA covers all training costs. Learn more about the trainings and how to sign up to participate by going to www.cdc.gov/nceh/ehs/elearn/ehter.htm.

Kansas Environmental Health Association

2018 Spring Conference

April 19 and 20, 2018

The Bluemont - Manhattan, KS

NAME: _____

ORGANIZATION: _____

ADDRESS: _____

TELEPHONE: _____ **EMAIL:** _____

Conference Registration

Member .....$50.00 $ _____

Non-Member .....$70.00 $ _____

2018 KEHA Membership Dues .....$20.00 $ _____
(January 1, 2018 to December 30, 2018)

Scholarship Donation .....$ _____

Jo Funk Memorial Fund ..... $ _____

TOTAL AMOUNT DUE..... $

(Money does NOT have to accompany form.)

Please make sure information is complete and include one form for each person attending the conference.

Please send this registration form and/or payment to:

Beth Rowlands, KEHA Treasurer
P O Box 1969
Lawrence, KS 66044-1969
Email: beth.rowlands@ks.gov
Phone: 785-842-4600

Administrative Use Only:

_____ Date: _____ Amount: _____
Beth Rowlands, KEHA Treasurer

The 2018 Kansas Environmental Health Association Spring Conference

Manhattan, KS

Bluemont Hotel

The room rate this year is at $93.00 per night. To Make Hotel reservations see below. To ensure rate and availability **make your reservations by March 23 to get the KEHA block rate.**

1. You can call the hotel reservation line (785-473-7091 press 0) and ask for "KEHA KS Environmental Health Assn".
2. You can make a reservation online:
   * Go to www.bluemonthotel.com
   * Click on BOOK NOW
   * Click on CLICK HERE FOR GROUP RESERVATIONS (also upper right corner)
   * Enter the Group ID: KEHA0418 / password: keha
   * Enter the correct arrival/departure date and make their reserve tion

** NOTE: if the guest is coming/going before or after the contracted dates, they will not be able to reserve online. Only the contracted dates are allowable online.

2018 KEHA Spring Conference Program

Bluemont Hotel
Manhattan, KS

Thursday, April 19

1:00 – 1:15	Registration/Opening Remarks
1:15 – 1:45	Website Development for Environmental Professionals, Darcy Basye, BS, RS, Reno County Health Department
1:45 – 2:45	Floodplain Issues as it Relates to Sanitary and Zoning Codes, Steve Samuelson, KDA-BWR
2:45 – 3:00	BREAK
3:00 – 4:00	Custom Threading and Slotting for Well and Septic Pipe, Factory Tour Ben Brunner, Environmental Manufacturing, Inc.
4:00 – 5:00	The Greasy Dilemma, Facility Tour During Polymer Processing, Matthew & Arica Wallace, Cat Cans Portable Service of Manhattan

DINNER ON YOUR OWN

Friday, April 20

7:30 – 8:00	Warm Breakfast Downstairs included with Hotel Stay
8:00 – 8:05	Opening Remarks
8:05 – 9:00	Embracing Software, GIS & Cell Phone Apps. Effectively Enhance Your Work Load and Customer Service, Shawn Esterl, BS, Saline County Environmental Service
9:00 – 10:00	Safety Concerns for the Vending and Commercial Ice Machines. What Regular Maintenance should be done? Walter Berry, Berry's Arctic Ice LLC
10:00 – 10:15	KDHE Updates, Rachel Marlett, Environmental Specialist, KDHE Watershed Management Section LEPP and WRAPS programs
10:15 – 11:15	Society, Cost/Value, and Accountability Issues of Wastewater Industry, John McNellis, President & Owner, Aero-Mod Inc.
11:15 – 11:30	Closing Remarks

APPLICATION FOR MEMBERSHIP

Name: _____

Business/Organization Name: _____

Address to Send Association Mail: Please Check One Home ____ Business ____

_____

_____

Contact Phone for Association Business: Please Check One Home ____ Business ____

_____

Contact Email for Association Business: Please Check One Home ____ Business ____

_____

INDICATE SECTION MEMBERSHIP PREFERRED:
___ General Sanitation Section ___ Special Sanitation Section

SERVICE LEVEL:

____ $20.00 Annual Membership Dues
(January 1, 2018 to December 31, 2018)

____ (No cost) Student Membership

Please Send To:

Beth Rowlands
KEHA Treasurer
P. O. Box 1969
Lawrence, KS 66044

Kansas Environmental Health Association

Mission Statement: ***The objective of the Kansas Environmental Health Association is to promote competency and effectiveness in Sanitarians and other Environmental Health Professionals engaged in the regulation and management of the Kansas Environment.***

2/27/2018

Kansas Small Flows Association,
Kansas Dept. of Health and Environment
& Kansas Environmental Health Association

Invite you to the

Pratt County SOILS WORKSHOP
May 1st & 2nd, 2018
Pratt, KS

NAME:_____
(Please Print) Last First MI

TITLE:_____

COMPANY/AGENCY:_____

ADDRESS:_____

CITY:_____ STATE:_____ ZIP:_____

PHONE:_____ FAX:_____ EMAIL:_____

REGISTRATION FEES:
Organization_____Member: $225.00___Non-Member: $275.00___
Registering at the member rate, please state your organization affiliation in the space above.
Proceeds above expenses will be donated to KEHA/KSFA.

Pay by check: Amount Enclosed $_____ Check#_____

Please make checks payable to: "Pratt County Environmental Services" and mail this form and check to the following address:

449 SE 20th St., Pratt, Ks 67124
For more information, call or email: 620-672-4127 rtorres@prattcounty.org
Class size is limited - so reserve your spot now.

DATE:_____SIGNATURE:_____

ONSITE WASTEWATER: TRAINING/EDUCATION FOR ONSITE PROFESSIONALS

May 1-2, 2018 Pratt County Soils for Onsite Wastewater

Agenda Tuesday, May 1 - (Class Room Only)

9:00 AM Registration Introduction – Workshop Objective (Robert Torres)

9:30 Basic Soil Characteristics (DeAnn Presley)

10:30 Water Movement in Soils (Video)

11:30 Importance of Wastewater Treatment & Dispersal (DeAnn Presley)

12:30 Lunch

1:00 Soil Texture and Structure Determination Technique Demonstration Active Class Participation (Tyler Labenz)

2:30 Using the Web Soil Survey (Tyler Labenz)

3:00 Soil Profile Evaluation Fundamentals (How to Use This Information to Derive A Wastewater Loading Rate) (DeAnn Presley)

4:30 Wrap-up -- Summary – Instructions for Field Practice (Robert Torres)

Agenda Wednesday, May 2

8:00 AM Assemble at Classroom Travel to Field Practice Site

8:30 Teaching Profiles "Here's How We Do It" (Tyler Labenz)

9:00 Three Class Participation Profiles (Split into small groups)

11:00 Depart for Classroom

11:30 Lunch

12:30 Panel Discussion of The Three Class Participation Profiles What was the estimated loading rates? What wastewater systems would be most appropriate? (DeAnn Presley)

2:00 Written Examination (Robert Torres to get exam from Kansas Small Flows Association)

3:00 Review Field Activities and Test Answers (Robert Torres)

3:45 Final Comments – Turn in Meeting Evaluation Forms (Robert Torres)

Alternative Treatment Unit Training

Located at the Pratt County Fairgrounds,
One mile south of Pratt, Ks at 81 Lake Rd

This training will feature some of the newest technologies available in our industry today!

With increasing pressures from population crowding, sensitive environments, groundwater protection…
It is imperative we all learn how to best protect people, the environment and our groundwater.

Contractors, Sanitarians,
anybody involved in the septic and sewage industry,
Plan on registering for the training:
Thursday and Friday, May 3 & 4, 2018

These presentations by our vendors will qualify for CEU credits.

Participating vendors include:
BioMicrobics, Infiltrator, Hoot, Jet, NORWECO, Presby, and SI Precast

Cost for attendees will be:
$100 for members (KEHA, KSFA, KGWA) $150 for non-members.

----------cut and return----------

Company: _____
Name of attendee: _____
Title: _____
Contact info: email and/or phone_____

Circle one - $100 or $150 Organization_____
(If registering as member – state your organization membership) _____

Send check to Pratt County Environmental Services
449 SE 20th St., Pratt, Ks 67124 All proceeds above expenses will go to KEHA and KSFA.
Questions? call 620-672-4127 or email rtorres@prattcounty.org

Sponsored by KDHE, KEHA, KGWA, & KSFA

Pratt County Environmental Services
449 SE 20th St Pratt, Ks 67124
Phone: 620-672-4127 Fax: 620-672-4128
PCES Director – Robert Torres
E-Mail: rtorres@prattcounty.org

Alternative Treatment Unit Training

May 3 & 4, 2018 Pratt County Fairground, 81 Lake Rd., Pratt, Ks

Wednesday, May 2, 2018 ---- 5 p.m. – 7 p.m. ---- booth and product set-up

Thursday, May 3, 2018

8:15 a.m. – 9:00 a.m. ---- coffee and snacks
8:30 a.m. – 9:00 a.m. ---- Registration of attendees
8:30 a.m. – 9:00 a.m. --- Visit with vendors
9:00 a.m. – 9:15 a.m. ---- Welcome, etc. – Robert Torres
9:15 a.m. – 9:30 a.m. ---- Introduction to training – Tom Fritts
9:30 a.m. – 10:30 a.m. – ATU, Hoot
10:30 a.m. – 10:45 a.m. – Break/visit with vendors
10:45 a.m. – 11:45 a.m. – ATU, BioMicrobics

11:45 a.m. – 12:30 p.m. – Lunch and visiting w/ vendors

12:30 p.m. – 1:30 p.m. – ATU, NORWECO
1:30 p.m. – 2:30 p.m. ---ATU, Jet Wastewater Treatment Solutions
2:30 p.m. – 2:45 p.m. --- Break/visit with vendors
2:45 p.m. – 3:45 p.m. --- ATU, Presby
3:45 p.m. – 4:45 p.m. --- ATU, SI Precast
4:45 p.m. – 5:00 p.m. --- Days wrap-up

Friday, May 4, 2018

8:00 a.m. – 8:15 a.m. --- coffee and snacks
8:15 a.m. – 8:30 a.m. --- Welcome back and intro to today's training
Robert and Tom
8:30 a.m. – 9:30 a.m. --- Remediation, Infiltrator
9:30 a.m. – 9:45 a.m. --- Break/visit with vendors
9:45 a.m. – 10:45 a.m. – Remediation, BioMicrobics
10:45 a.m. – 11:15 a.m. – Panel discussion
11:15 a.m. – 11:45 a.m. – Wrap-up, Dale Hayes (KGWA)
--- "Location, Location, Location, Property and Water"
11:45 a.m. – 12 noon --- Training wrap-up/prizes

Looking forward to a GREAT and much needed Training Day in Pratt, Ks,

Robert Torres
Director, Pratt County Environmental Services

The Flu May Be Spread By Just Breathing, Study Says

For years, you've been told to cover your mouth when you cough or sneeze, especially when you're sick. But a new study finds that it may be possible to spread the flu just by breathing—no coughing or sneezing required.

"People shed a lot of virus all the time, even when they don't cough," says Donald Milton, author of the study published in *PNAS* and a professor of environmental health at the University of Maryland School of Public Health. "As a result, it's important to realize you can be infectious at any time."

During the 2012-2013 flu season, Milton and his colleagues studied 142 University of Maryland students with active influenza, attempting to track how and when they expelled virus particles. During a total of 218 30-minute observation sessions, the students sat in a machine that could measure the droplets they shed while breathing, talking, coughing or sneezing. While coughing did expel some flu particles, the researchers discovered that almost half of the aerosol particles collected in the absence of coughing also contained flu matter, suggesting that simply inhaling germ-ridden air could get you sick

The researchers also found that men shed more flu virus per cough than women, but women coughed more frequently. People with a higher body mass index also tended to expel more viral particles than people with a smaller BMI, perhaps because higher BMIs have been linked to higher rates of inflammation and more frequent closing and reopening of small airways, Milton says.

All that said, Milton notes that the study did not track transmission, so it's impossible to say for sure whether the exhaled droplets would have given someone the flu. In fact, the validity of airborne transmission is a controversial topic in the medical world. But Milton says the new study suggests that, "if that person next to you looks really sick, even if they're not coughing, they can probably infect you."

If future studies can prove that these tiny, airborne droplets can pass on the flu, those findings could potentially lead to changes in the way public spaces are built and ventilated, Milton says. (His team is currently studying how flu is transmitted in the freshman dorms at the University of Maryland.) Until then, though, he says the study should serve as a reminder to stay home from school or work when you come down with an illness

"The take-home message is to stay away from other people when you're sick with flu-like symptoms, even if you're not coughing," he says.

But what if your sick cubicle neighbor comes into the office anyway? Unfortunately, there's more bad news for germaphobes: Milton says past research has shown that flu masks do little to stop the kind of fine particles measured in the study.

"There's not much evidence that any of that works very well," he says. "Surgical masks block mostly the large droplet spray, but the surgical masks don't block the fine particle aerosols very well. The route of infection matters."

Time Magazine, January 19, 2018

Dirty Water Taking Toll on American's Health, Wallets

Water pollution is damaging Americans' health, and at a high financial cost, too, new research finds.

Water related recreational activities lead to more than 90 million cases a year of gastro-intestinal, respiratory, ear, eye, and skin—related illnesses in the United States, according to the study. The researchers calculated that those illnesses result in $2.9 billion a year in medical costs and costs related to time away from work or school.

For the study, researchers from the University of Illinois at Chicago assessed water-borne illnesses contracted from swimming, paddling, boating and fishing in lakes, river and other natural bodies of water. The study did not examine illnesses associated with swimming pools or water parks.

"The costs associated with these illnesses help us put into perspective the costs of projects that aim to help make our recreational waterways cleaner and safer," Samuel Dorevitch, an associate professor of environmental and occupational health sciences, said in a university news release.

"The costs of beach monitoring and notification programs over the summer months are known," Dorevitch said. "But until now, we haven't known the cost associated with illness acquired through recreation on natural waters. This information should help policymakers put the costs of water-quality monitoring and water-quality improvement projects into context.

However, the findings should not panic people, he said. "At 90 million illnesses out of an estimated 4 billion total water recreation events annually in the U.S., the number of people who get sick is around 2 percent," Dorevitch explained.

That said, he added that it's not easy to determine exactly how many illnesses result from water recreation.

"If somebody gets sick a couple days after swimming and visits their doctor, the root cause of the illness—bacteria or viruses in the water—may not be recognized or investigated," Dorevitch noted.

About $10 million has been allocated annually for beach—water protection efforts, he said, calling "a small fraction of annual estimated illness burden."

Dorevitch suggested that the stepped up efforts "to reduce severity of illness among water recreators should be explored to reduce total economic burden while encouraging more individuals to enjoy safe surface—water recreation."

The study findings were published online Jan 9 in the Journal of Environmental Health.

Your Dishwasher Is Not as Sterile as You Think

Your dishwasher may get those plates spotless, but it is also probably teeming with bacterial and fungus, a new study suggests.

Microbes—from bacteria to viruses to fungi—are everywhere, including within and on the human body. So it's no surprise, the researchers said, that a kitchen appliance would be hosting them.

So do people need to worry about getting sick from their dishwashers? No, said Erica Hartmann, an assistant professor at Northwestern University who was not involved with the study.

"The risk is probably in the realm of a shark attack." she said. That is, most people face little to no risk, but there are select groups who may be at a higher risk—in this case, people with conditions that weaken their immune defenses.

Dishwashers are an interesting case when it comes to microbes because they are actually an "extreme" habit, Hartmann explained.

"People don't think of them that way. It's just your dishwasher. But it really is an extreme environment," said Hartmann, who studies the microbiology of the indoor environment.

Dishwashers create constantly fluctuating conditions—wet to dry, high heat to cooler temperatures, low to high acidity. They also harbor mixtures of detergents and dinner scraps. So, only certain microbes will thrive.

The new study looked at which bacteria and fungi are actually dwelling there, and what factors seem to influence that he microbial makeup.

Specifically, the European researchers took samples from the rubber seals of 24 household dishwashers.

Overall, they found, the most common bacteria included Pseudomonas, Escherichia and Acinetobacter—all of which have strains that are "opportunistic pathogens." That means they are normally harmless, but can cause infections in people with a compromised immune system.

The most common types of fungus were Candida, Cryptococcus and Rhodotorula—which also include opportunistic pathogens.

Nina Gunde-Cimerman, a professor of microbiology at the Univeristy of Ljubjana, in Slovenia, worked on the study. She said dishwashers and other microbe-hosting appliances are "generally safe" for healthy people. It's "sensitive groups," she said who may need to be more cautious.

Gunde-Cimerman said she and her colleagues suspect dishwashers might play a role in fungal infecitons called mycoses in certain immune-compromised patients. A fungus commonly found in those patients, she said, is known as Exophiala dermatitidis, or black yeast. And while the fungus is “hardly known in nature,” she said, it’s very easy to find in dishwashers.

However, Gunde-Cimerman stressed, that’s speculation . No one has yet proven a connection between dishwasher microbes and mycoses infections.

How do fungus and bacteria get into the dishwasher? The “main entry point” for fungi is the tap water that supplies the appliance, Gunde-Cimerman said. But food, people and pets are other potential sources, she added.

As for the bacteria, the source isn’t clear, according to Gunde-Cimerman. “But we speculate that contaminated food is the main entry route,” she said.

It is possible for dishwasher microbes to break fee from their home: They can get out via waste water or through the hot air produced at the end of the dishwasher cycle, Gunde-Cimerman said.

So one way to keep the microbes contained is to avoid opening the dishwasher before it has cooled down, according to Gunde-Cimerman.

“Do not open the dishwasher when it is still hot and humid,” she said, “to prevent the release of aerosols in the kitchen.“

Wiping the rubber seal with a dry cloth at the end of a cycle can also limit microbe buildup, Gunde-Cimerman said.

Hartmann agreed that people who are concerned can wipe down the dishwasher seal.

But she also emphasized the positive aspects of the microbial communities living in all our homes: Scientist have made great discoveries by studying microorganisms.

Hartmann pointed to the example of a bacterial enzyme discovered in the hot springs of Yellowstone National Park. It was instrumental in developing a breakthrough technique called polymerase chain reaction, which is now used to study DNA in research and clinical labs everywhere.

“Your kitchen might not be Yellowstone,” Hartmann noted. But, she added, it may host some “pretty amazing” microbes.

So if you are ever presented with the opportunity to have a researchers swab your kitchen, Hartmann said, consider it.

Article from Drugs.com website on January 12, 2018

A New Kind of Small Flows?

One of the more fascinating developments in housing over the last 15 years has been the emergence of the tiny house movement. Interest in tiny houses—which have a living area of between 100 and 400 square feet—has boomed in the past several years—enough to support TV reality shows and a multitude of blogs and YouTube videos.

The tiny house movement is bolstered by the participation of both young people and retirees. Regardless of their age, tiny house dwellers are frequently motivated by affordability and the desire for a greener and simpler lifestyle. With zoning laws and construction codes that didn't foresee tiny homes, though, sometimes achieving a simple lifestyle can be complicated.

One of the challenges of tiny house living is finding the best way to deal with wastewater: water from toilets, sinks, showers, and other fixtures. There are a number of options, all with their own set of plusses and minuses. The most suitable option usually depends on the particular circumstances of the house—is it mobile or permanently sited, for example—and the preferences of the dwellers. What options local environmental and public health agencies will permit is also a consideration.

Sewers and Septic Systems

For permanently sited homes located in areas that have an existing network of sewers, the house can usually be connected to the sewer. There will be a fee for the connection. These vary from place to place, but the total cost for permit fees and connecting the line is usually somewhere between $1,000 and $5,000, depending on how close the house is to an existing sewer line. Most places that have sewers also have city water, so residents typically have a sewage bill that is based directly on the amount of water used.

In areas where there are no sewers, one option for permanently sited homes is to have a septic system installed. Septic systems have two main components—a septic tank that separates solids from liquids by allowing the solids to settle to the bottom of the tank, and a drainfield that receives the remaining liquid portion of the wastewater and disperses it through a subsurface network of perforated pipes into the soil where it is absorbed and further treated.

Different states and localities have varying design standards for septic systems. All septic systems, however, are designed to be able to absorb a certain volume of water per day. The design volume is often based on the estimated number of occupants in the house, which is usually based on the number of bedrooms in the house

Most agencies that issue permits for septic systems are likely to view a permanently sited tiny house as a one-bedroom house and require that a septic system be built that would be able to absorb whatever minimum daily flow has been established for that state. This may vary from 150 to as much as 400 gallons per day (gpd) depending on the state. Some agencies may consider a tiny house on wheels to be equivalent to a mobile home, which may have a higher design flow standard than a one-bedroom house.

Although no formal studies have been conducted to document how much water the occupants of tiny houses actually use, it is likely much less than the typical average American uses (between 80 and 100 gpd per person). This means the owner of a tiny house may be required to build a septic system that is larger—and more expensive— than what is actually needed. It is also possible that an agency permitting septic systems may consider a variance, especially if the house is not connected to a water line or a well.

In addition to rules that determine the size of a septic system, states also have rules that specify how far components of a septic system must be from water lines, wells, lakes, streams, and property lines. There are also rules that specify how much vertical separation there must be from the bottom of a septic drainfield to the top of the groundwater table. These rules, and others, influence where a septic system can be installed on a property.

Not all potential home sites have suitable soils and site conditions that would allow for a conventional septic system to be installed. Some sites require the addition of a mechanical treatment unit or an alternative drainfield, which can increase the cost of the system significantly. On some sites, a properly permitted alternative septic system could approach the cost of the tiny house itself.

However, being connected to a sewer or septic system allows one to have a standard flush toilet, which is important to some people. These systems also accept all wastewater from the house, both toilet waste (or black water) and greywater from sinks, showers, and clothes washers.

Composting Toilets

In circumstances where neither sewers nor septic systems are options, many tiny house dwellers use composting toilets and other alternative toilets. There are a wide variety of designs for composting toilets—ranging from homemade versions using five-gallon buckets to manufactured models costing thousands of dollars. What they have in common is that, when operating properly, they use natural biological and physical processes to convert human excretions into an odor-free, humus-like material that can be used as a soil additive.

Composting toilets provide some major advantages. Most don't use water so they can be used without being connected to a water line or without consuming stored water. Some types require no energy, which is a big advantage for off-grid houses that rely on just a few solar panels.

There are disadvantages, however. Many states regulate composting toilets in such a way as to make their use in permanently sited houses challenging. For example, many states only approve composting toilets that meet standards set by the National Sanitation Foundation International (NSF/ANSI Standard 41, non-liquid toilets). This limits the choice of composting toilets to a handful of manufacturers. States may allow for the approval of non-proprietary or site-built units on a case-by-case basis, but the approval process may be time-consuming. And, unfortunately, the compost produced is subject to federal rules regulating biosolids, which are reflected in state rules that restrict how the compost can be used.

There are a variety of types of manufactured composting toilets. Some use a continuous process where the contents slowly are converted to compost as the material works its way down a sloped incline. Others use a batch process where a full container composts while another is being filled. Some have electrical components that speed the composting process by aerating, mixing, or heating the contents.

A downside of manufactured composting toilets, in addition to the price tag, is that they may be too large for tiny houses. Most are more suitable for permanently sited homes. The deluxe models with heaters and agitators may also draw too much current for an off-grid solar house with limited electrical production.

At the low-tech end of the spectrum is the method developed by Joe Jenkins and described in his book, The Humanure Handbook. This method, sometimes referred to as the "sawdust toilet," is used by many tiny house occupants. It has the advantages of being the most affordable and arguably the greenest method of recycling human excretions—if managed conscientiously.

In brief, a plastic five-gallon bucket serves as the receptacle for feces, urine, and toilet paper, which, after each deposit, are covered with a layer of organic material to prevent odors. Possible cover materials include rotted sawdust, peat moss, coconut husk fiber, dried grass clippings, rice or coffee bean hulls, or other suitable locally available material. A comfortable housing for the bucket can be built with a standard hinged toilet seat and a cover that allows for easy access to the bucket.

When the bucket approaches being full, it is carried to an outdoor compost pile where the contents are placed in the middle of the pile and completely covered with other organic material such as straw, hay, or leaves. This allows the compost to heat up to temperatures that will kill any pathogens that might be present.

The main concern with this method is that it requires the availability of a considerable amount of organic material for both cover material for the bucket contents as well as for the compost pile. For some, this may mean having suitable organic material trucked in. The user also must 5

be committed and fit enough to carry the bucket to the compost pile and incorporate it into the pile. Some people have modified this method to successfully compost humanure in containers such as large plastic drums.

Some tiny house dwellers use toilets that fall somewhere between an NSF-approved toilet and a five-gallon bucket. These tend to be smaller toilets that were developed for use on boats or in seasonal cabins. They resemble a conventional toilet but use no water for flushing. Urine is separated from the feces and collected in a separate receptacle. Like the bucket method, feces and toilet paper need to be covered with an organic material to control odors. Both the liquid and solid contents need to be removed as necessary, depending on the level of usage.

Users typically have either added the solids to an outdoor compost pile or bagged and disposed of them with their regular household trash. Users of these types of toilets still need to dispose of their urine. Because urine has fewer bacteria than feces and is a plant nutrient, some tiny house dwellers have disposed of it by sprinkling it on the ground. In many cases, because of the volume of urine produced, this can create the potential for nitrogen contamination of shallow groundwater and nearby streams, as well as odor problems. Some users dispose of their collected urine by draining it into an accessible toilet that is part of a conventional sewer system.

These smaller dry toilets and sawdust toilets cannot technically be considered composting toilets. Neither have the capacity to allow much composting to take place within the toilet—almost all of the composting takes place in an outdoor composting pile or in larger outdoor containers. Many states have not specifically addressed the acceptability of composting urine and feces so this type of composting may fall into one of those gray areas where it isn't clear whether it is legal or not. It is likely that as tiny houses become more common though that states will begin to pay more attention to this practice.

Incinerating Toilets

Another option for disposing of toilet waste is an incinerating toilet. Using electricity, natural gas, propane, or diesel, these units reduce human waste to a small volume of ash by heating the waste to temperatures well above 1000° F, which evaporates the liquids and burns the solids.

Like other options, there are pros and cons. The benefits are that they use no water so there is no plumbing required. Some models are NSF Standard 41 certified so getting local approval may be easier than with some of the other options. They are relatively compact.

A downside is the initial cost, which is usually in the range of $1,500 to $2,000. The energy use must also be considered. The electrical models use approximately 1.5 kilowatt-hours per incineration making them generally unsuitable for most off-grid solar houses with a small number of panels. The gas-fired models use less but still require electricity to begin the combustion process and for the auger that moves the waste to the burn chamber.

Users report minimal combustion odors indoors if the toilet is properly vented. Some combustion odor may be noticeable outdoors however, which may be a consideration for houses that are close to other houses. Some models may require the use of additives to insure complete combustion and to prevent foaming.

Holding Tanks

Some tiny houses make use of wastewater holding tanks. These tanks are similar to those used in many recreational vehicles (RVs). Typically, there are separate tanks for graywater and blackwater, although a single tank combining all wastewater may be used.

The toilet may be located directly above the blackwater tank to allow for gravity operation, although pressure or vacuum-assist toilets are also options. A small amount of water—two quarts or less— is used for flushing.

When full, the tanks are emptied at a dump station found at RV campgrounds, state parks, truck stops, and some highway travel plazas. Removable holding tanks make it possible to use holding tanks in permanently sited tiny homes. The sizes of the tanks vary, with larger tanks usually having wheels to make transporting easier.

An advantage of using holding tanks is that it allows for the use of a conventional flush toilet, which some may prefer to other options. As long as the tank contents are disposed of at approved dump stations— which are fairly common— there is no issue of questionable legality.

The disadvantages are that holding tanks, for reasons of weight and portability, are limited in volume. This means emptying the tank can often be a frequent chore. Many dump stations charge a fee if the person dumping is not a guest at the facility. Dump station fees can add up quickly.

Most people who use blackwater holding tanks use additives to control odors, minimize the production of sewer gases, and to liquefy solids to make disposal easier. Some additives in the past contained toxic chemicals such as formaldehyde. Enzyme-based additives are now available.

Packaging Toilets

Another type of alternative toilet that has been used in tiny homes is the dry packaging toilet. Packaging toilets wrap each deposit in plastic. The toilet uses a cartridge or roll that supplies a continuous feed of plastic to, first, line the toilet bowl and, then, wrap the deposit. The wrapped deposits are collected inside a heavy-duty plastic trash bag underneath the toilet bowl.

Each cartridge or roll provides enough plastic for multiple uses. When the cartridge runs out the bag containing the packaged waste is removed and discarded with other household trash and a new storage bag and cartridge is installed. Some packaging toilets use a biodegradable plastic that allows the waste to then be composted.

Packaging toilets are compact and, reportedly, odor-free. No venting is required. The initial cost of the unit is less than half of that of a manufactured composting toilet. However, depending on the manufacturer, the cost of cartridges can make these toilets expensive on a per-use basis.

Pit Privies

In some states pit privies (or outhouses) are still permitted under certain conditions. They are usually intended for use in remote locations for buildings that are not permanently occupied, such as cabins. For tiny houses that are used as vacation cabins this may be an allowable option.

The benefits of a privy are that the pit and outhouse can be easily and cheaply dug and built. Having the toilet facilities outside of the house frees up a small amount of space and provides more privacy. The downsides are that the user must go outside to use the facility regardless of weather conditions. Measures can be taken to control odors but no pit privy is completely odorless. States also have regulations about the disposal of the pit contents once it is full and for decommissioning privies.

Dealing with Grey Water

States that permit the use of privies typically have requirements about where and how they may be built. Privies are typically required to be a specified distance from any habitations. There are required to be a certain distance from any streams or other surface water and the bottom surface of the pit must usually be at least three feet above the top of the groundwater water table at its highest seasonal level. Building requirements usually address venting and insect-control measures. These requirements vary slightly from state to state.

If toilet waste is handled by using either a privy or a composting, incinerating, or packaging toilet, the issue still remains of dealing with the disposal of greywater. This can be quite confusing as the regulations vary from state to state and, in some cases, among local agencies. This variability includes how greywater is defined. Some states define greywater as wastewater from any household fixture except for toilets—so, water from sinks, showers, tubs, clothes washers, and dishwashers. Some states, however, classify kitchen sink water as blackwater, not greywater.

Although greywater has fewer bacteria and less decomposable organic matter than blackwater, it still has the potential to create malodorous nuisance conditions if mismanaged. Even though there have been no documented cases of illnesses related to contact with greywater, public health agencies have historically been conservative about how they regulate it. In some states this means that the requirements for a greywater disposal system are similar to those for septic systems receiving blackwater, with a settling tank and subsurface dispersal lines. This could be disproportionally expensive for a tiny house that is generating a relatively small amount of greywater.

In recent years, some states, mainly those in the water-scarce western U.S., have begun to change their rules to make reuse of greywater easier. This may allow for the use of simpler, less expensive greywater dispersal systems in some places.

Regardless of how small the volume of greywater is though, regulatory agencies uniformly prohibit dumping it directly onto the ground surface where people are more likely to have contact with it, and where it is more likely to either form a stagnant pool or run off directly into nearby lakes or streams.

Tiny house dwellers should keep in mind that the design of an effective greywater dispersal system is site-specific: what works well in one place may not work well in another. Besides variations in regulations, site factors such soil characteristics, slope, proximity to lakes or streams, and the water needs of different types of vegetation must be considered. Tiny house owners should seek the advice of those who have experience with greywater system design in their area.

Managing toilet waste and greywater in tiny houses can be challenging. In many cases it is another example of where existing regulations do not match the unique characteristics of tiny house living. Tiny house dwellers should, however, strive to manage their wastewater as responsibly as possible to protect the environment, the reputation of the tiny house community, and the health of their families and neighbors.

Article from National Environmental Services Center (NESC)

Additional Resources

For more information about alternative toilets, see:

Del Porto, David and Carol Steinfeld. 1999. The Composting Toilet System Book

The Center for Ecological Pollution Prevention, Concord, MA.

Jenkins, Joseph. 2005. The Humanure Handbook, 3rd edition.

Accessed at : humanurehandbook.com.

These websites also have useful information:

Oasisdesign.net/greywater

greywateraction.org

www.recodenow.org

Where can I get more information about conservation?

The National Environmental Services Center developed a water conservation project titled “Future Water” that featured information, articles, and products related to wise water use. Visit www.nesc.wvu. edu/ futurewater/ to view this information.

EPA’s WaterSense program is a voluntary partnership that promotes water efficiency and fosters market demand for water-efficient products and services. Based on the successful Energy Star program, Water Sense seeks to raise awareness about the importance of efficient water use and to ensure that consumers can easily identify products that meet EPA’s standards. Learn more at www3.epa.gov/ watersense/ index.html.