Fact vs Fiction: The Top Ten Septic Myths

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Decentralized Obstacles to Overcome

Why address the myths?

1. Raise the level of the Decentralized Industry
2. Offer more professional advice
3. Become an Industry Leader

Myth #1:

A distribution pipe provides equal distribution?

True or False?...

Myth #1:

A distribution pipe provides equal distribution?

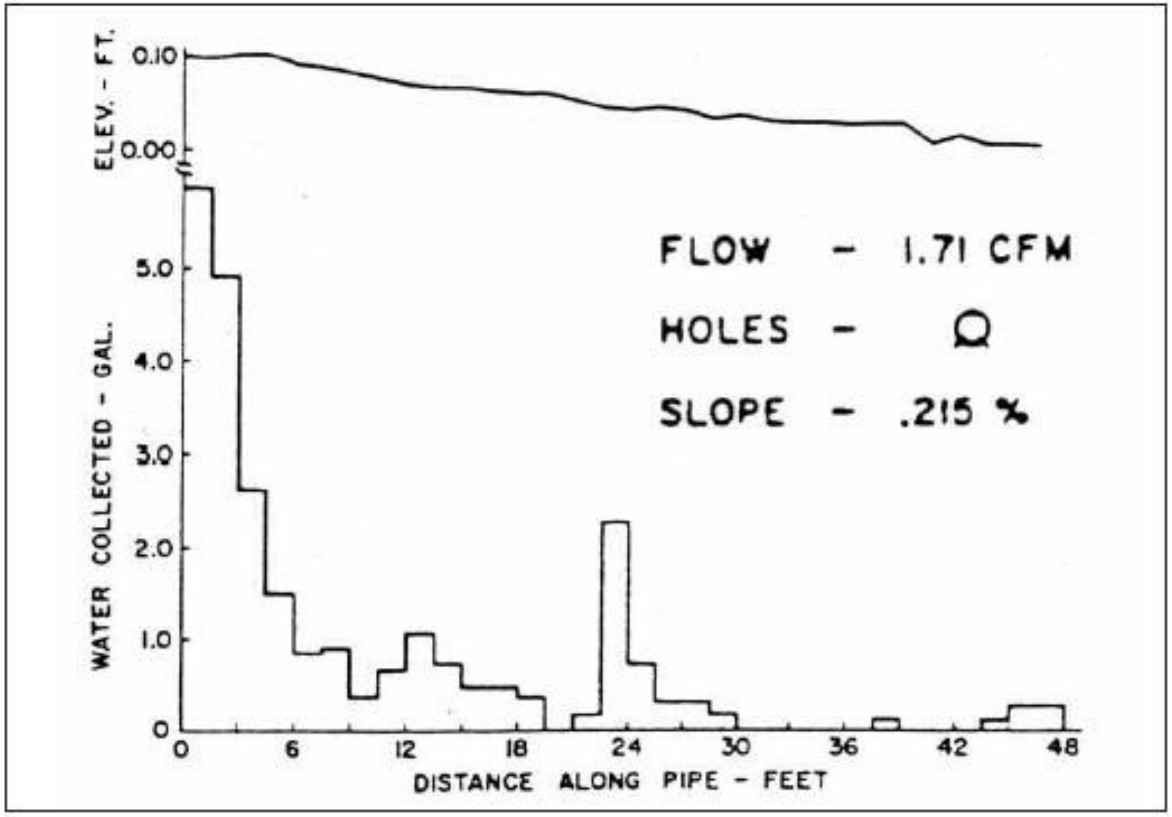
True or False?...

False

Several Studies have concluded that a perforated distribution pipe does not provide “equal distribution” within gravity fed onsite systems

Distribution Research

Distribution of Water along a 4-inch Perforated Pipe (Converse 1974)



Distribution Research

Machmeier and Anderson (1988): “Flow Distribution by Gravity Flow in Perforated Pipe”:

- “The term ‘distribution pipe’ as used for the pipe now commonly installed in drainfield trenches or seepage beds is definitely a misnomer with reference to liquid distribution.”

- “With one row of perforations at the 6 o’clock position, effluent will be discharged into the drainfield rock near the head of trench or bed.”

- “With perforations at the 4 and 8 o’clock positions, and the pipe absolutely level…effluent will concentrate at some random location where the perforations are at the lowest elevation.”

Distribution Research

- "If a pipe has a uniform slope it will concentrate at the far end."

- "…it is not likely that a perforated pipe will be installed as carefully in the field as for these tests, resulting in a random location for the concentration of effluent."

- "If pipe is necessary in a drainfield trench, it must be serving some function other than distributing effluent."

Myth #2:

A distribution box or header manifold provides equal distribution?

True or False?...

Myth #2:

A distribution box or header manifold provides equal distribution?

True or False?...

False

Are D-boxes or Manifolds ever installed level?
Do they ever settle?
Gravity flow is just a trickle in a 4” pipe

Distribution Research

Header Manifold Distribution Research

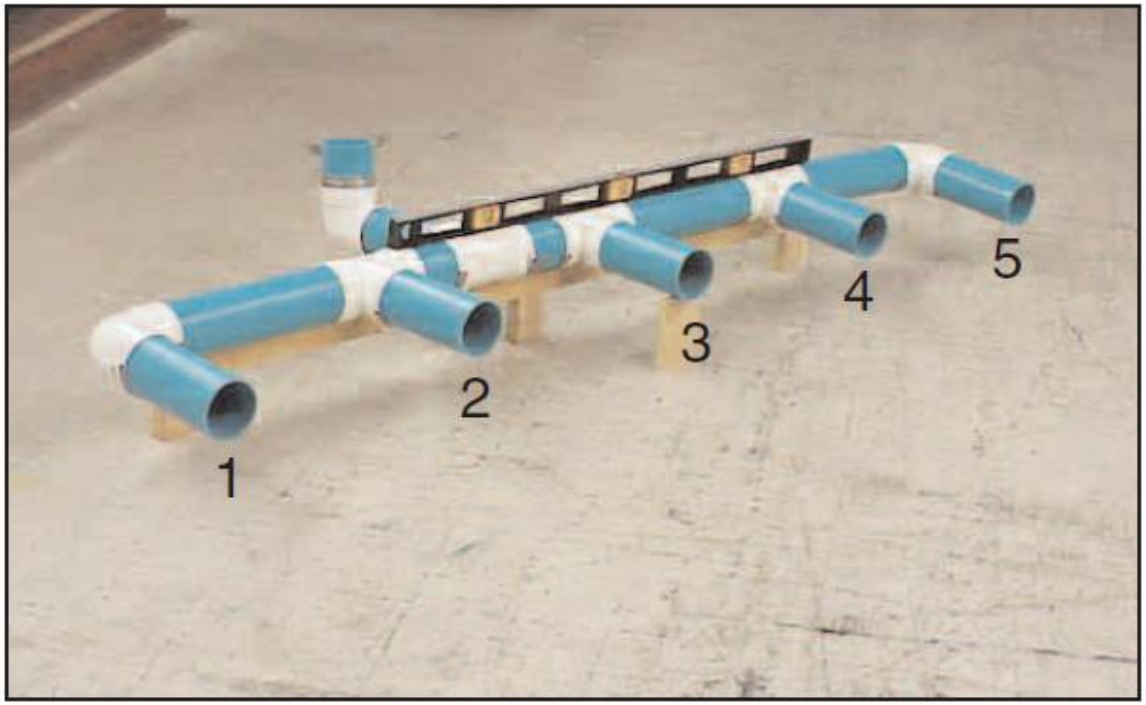


Figure 1: *Header manifold pipe directly connected to each drainlines.*

Distribution Research

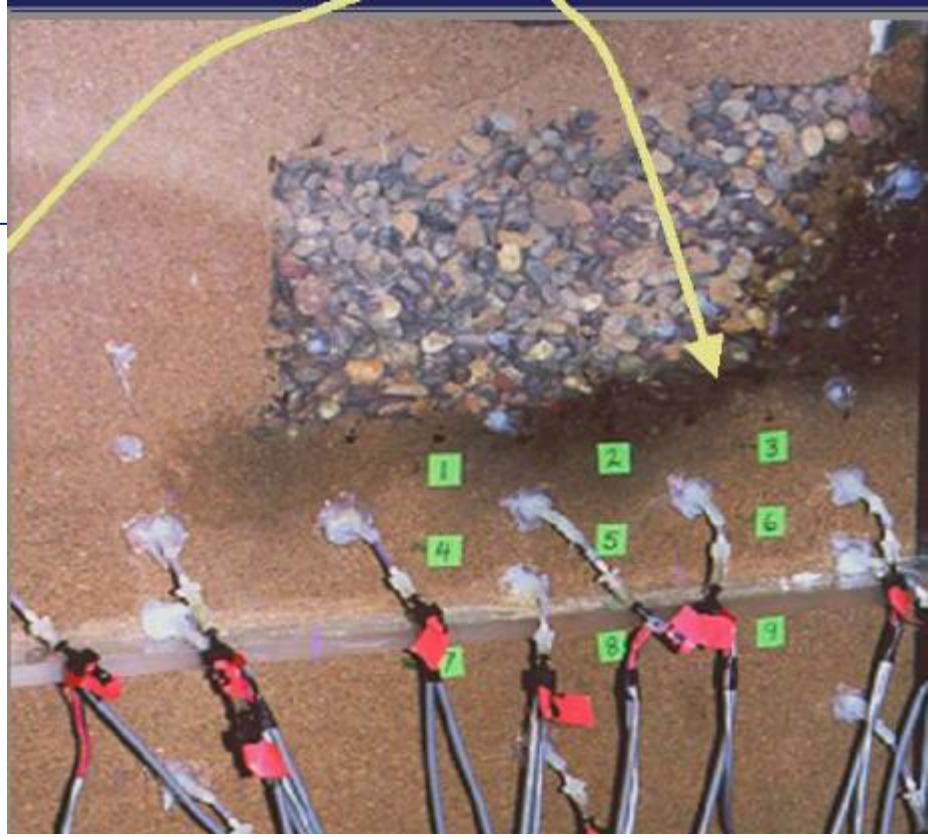
Table 1: *Distribution Quantity Summary for "Level Test"*

Level Test	Outlet 1 (Quarts)	Outlet 2 (Quarts)	Outlet 3 (Quarts)	Outlet 4 (Quarts)	Outlet 5 (Quarts)	Rate of Flow (gpm)
1	1.0	0.0	1.0	1.3	0.0	1
2	1.0	0.5	1.0	0.8	0.8	1
3	0.8	0.5	1.0	0.8	1.0	1
4	1.0	0.5	1.0	0.8	0.8	1
5	2.0	1.0	1.8	1.3	2.0	2
6	2.0	1.3	1.8	1.5	1.5	2
7	2.0	1.0	1.8	1.5	1.8	2

Myth #3:

Biomat is bad?

True or False?...

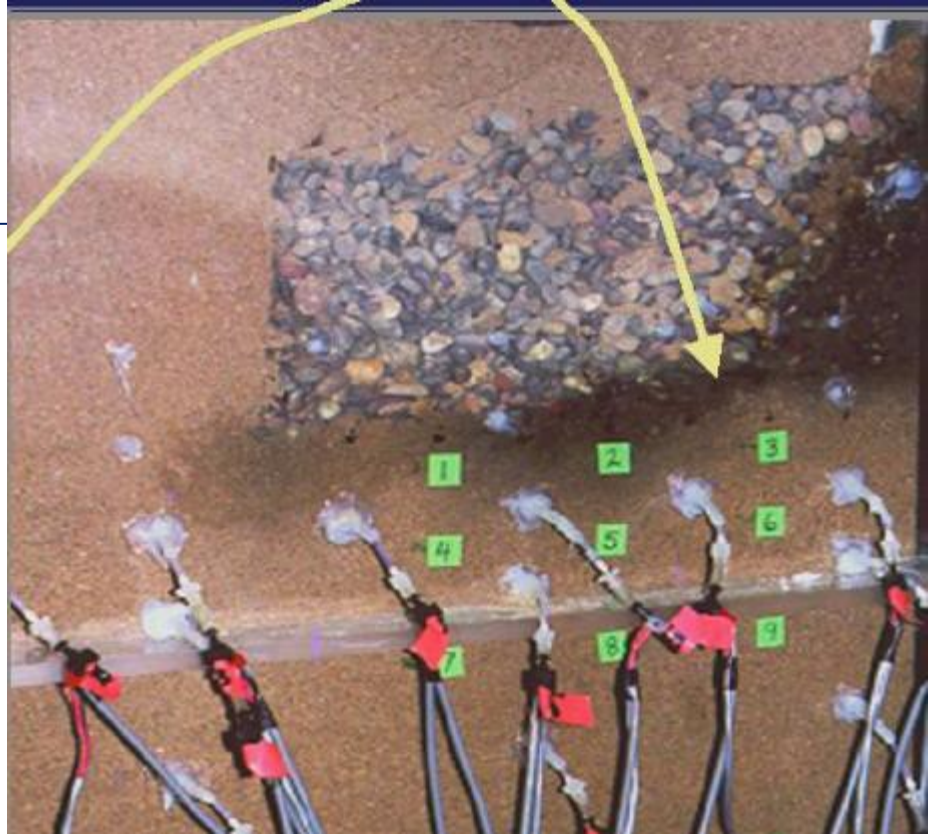


Myth #3:

Biomat is bad?

True or False?...

False

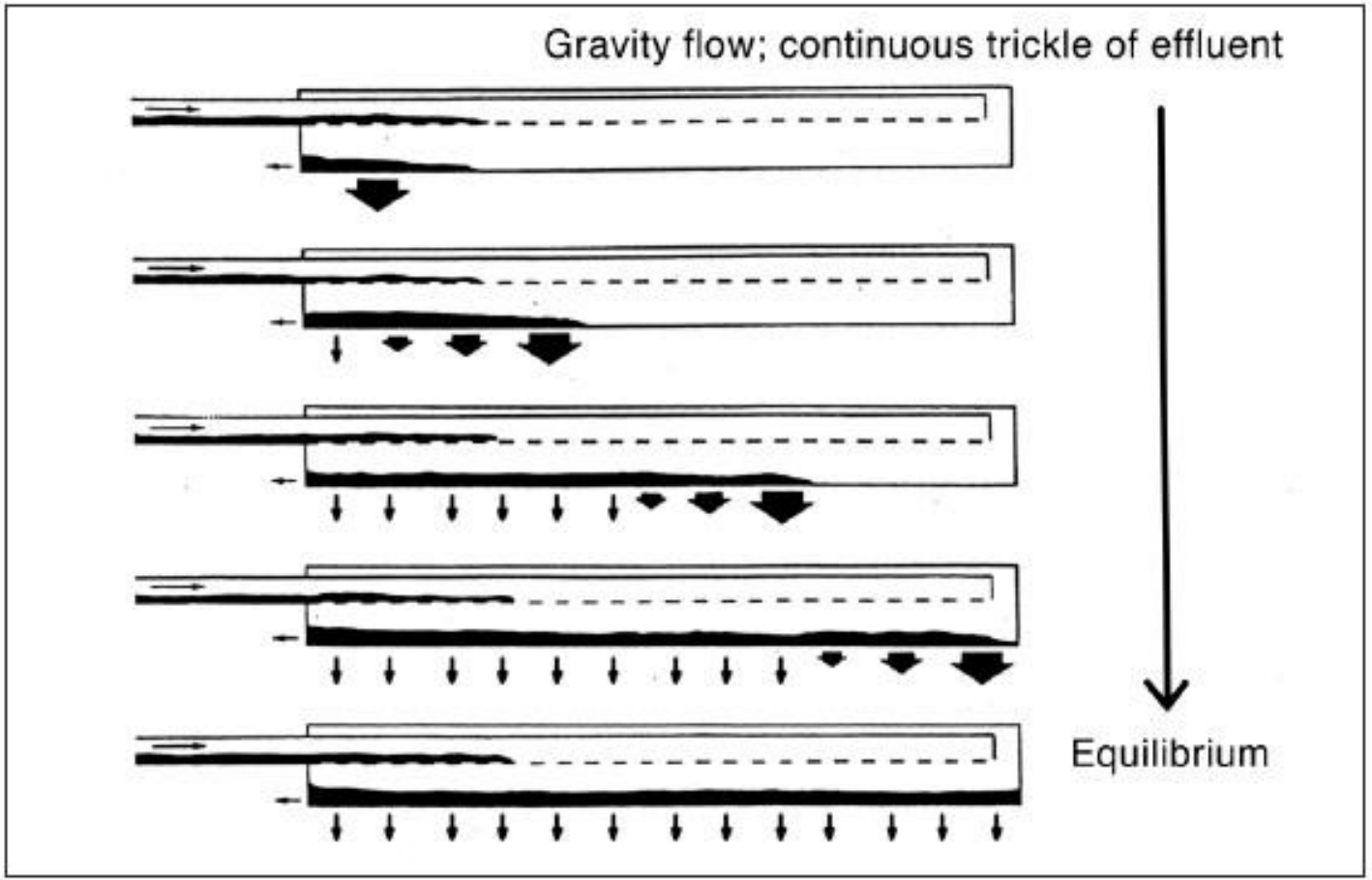


All systems will eventually develop a biomat, the biomat will provide equal distribution and better treatment

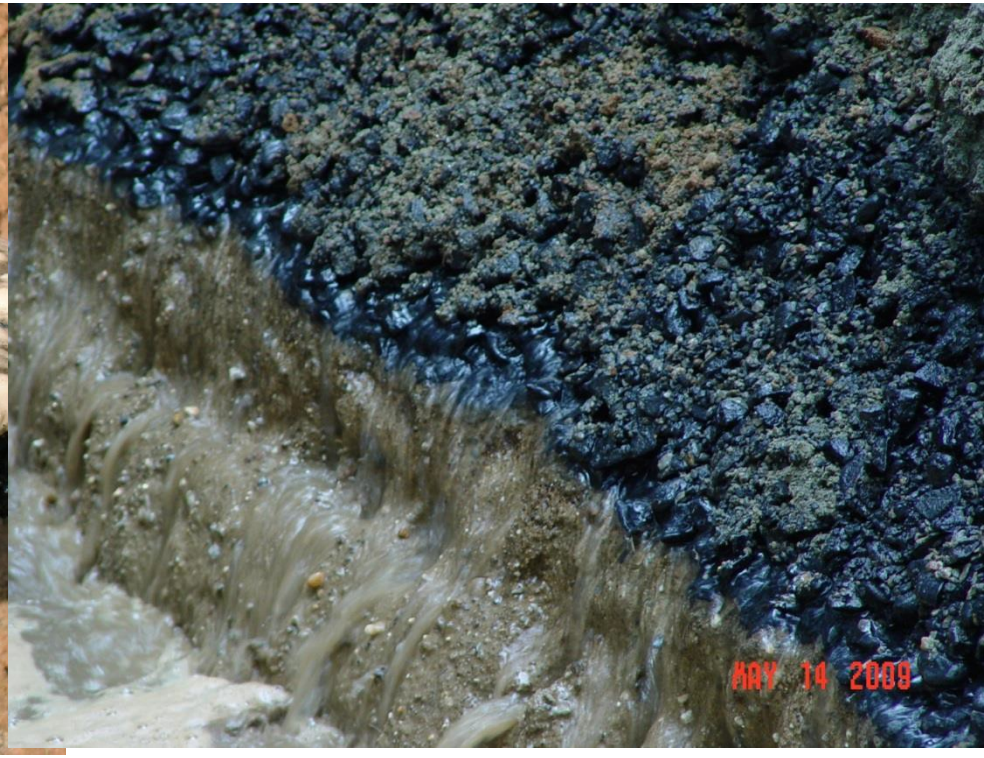
Treated-effluent Systems?

Biomat Development Research

Progressive Clogging of the Infiltrative Surfaces of Subsurface Absorption Systems (Bouma et al. 1972)



Biomat: Good or Bad



Myth #4:

Venting a distribution trench provides better treatment and/or performance?

True or False?...

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Venting a distribution trench provides better treatment and/or performance?

True or False?...

Well… what does the audience think?

Show us the data.

Venting: some items to think about

- Is the wastewater delivered to the trench anaerobic?

- Is the diffusion of oxygen from gas phase to liquid phase very efficient?

Venting: some items to think about

Ever seen a Lagoon?...

- Lagoon is completely open (vented)
- Much larger surface area
- And yet completely Anaerobic Effluent…

Myth #5:

Design Flow = Actual Flow?

I have a 3-bedroom home that has a water meter, it is reading that it is using 450 gpd, is that okay?

True or False?...

Myth #5:

Design Flow = Actual Flow?

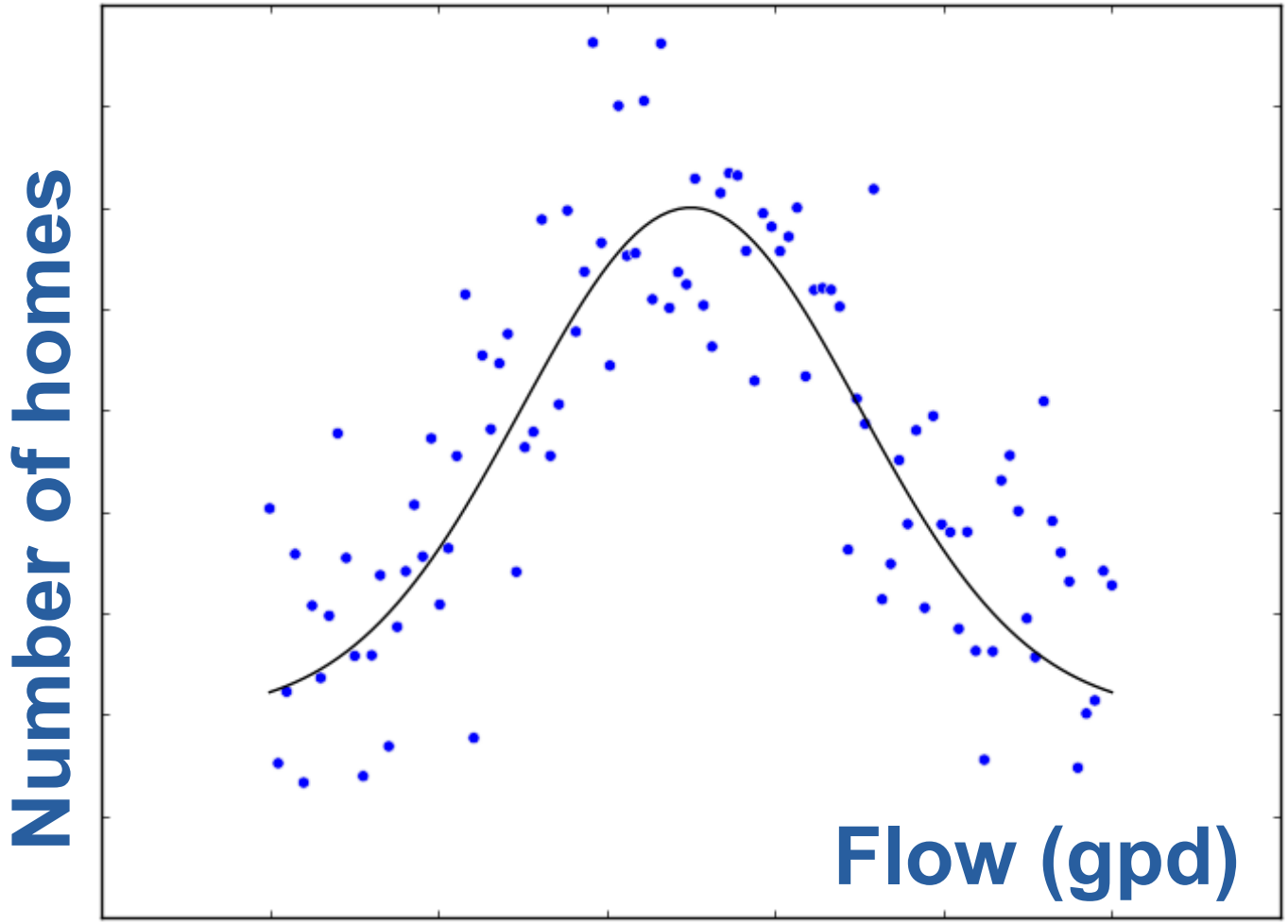
I have a 3-bedroom home that has a water meter, it is reading that it is using 450 gpd, is that okay?

True or False?...

False, Why?

Design Flow always incorporates a factor of safety

The Bell Curve – Statistics



Myth #6:

Roots are bad for the drainfield?

True or False?...

Myth #6:

Roots are bad for the drainfield?

True or False?...

Partially True?… well let me explain!

"…we are taking water (effluent) that is laden with nutrients and we are disposing it within the root zone… if you do not think that the roots will find it then you may want to call the tooth fairy…"

The Root Zone

Roots in the Drainfield – Good or Bad?

Roots, Roots, Roots

Myth #7:

All septic systems fail?

True or False?...

Myth #7:

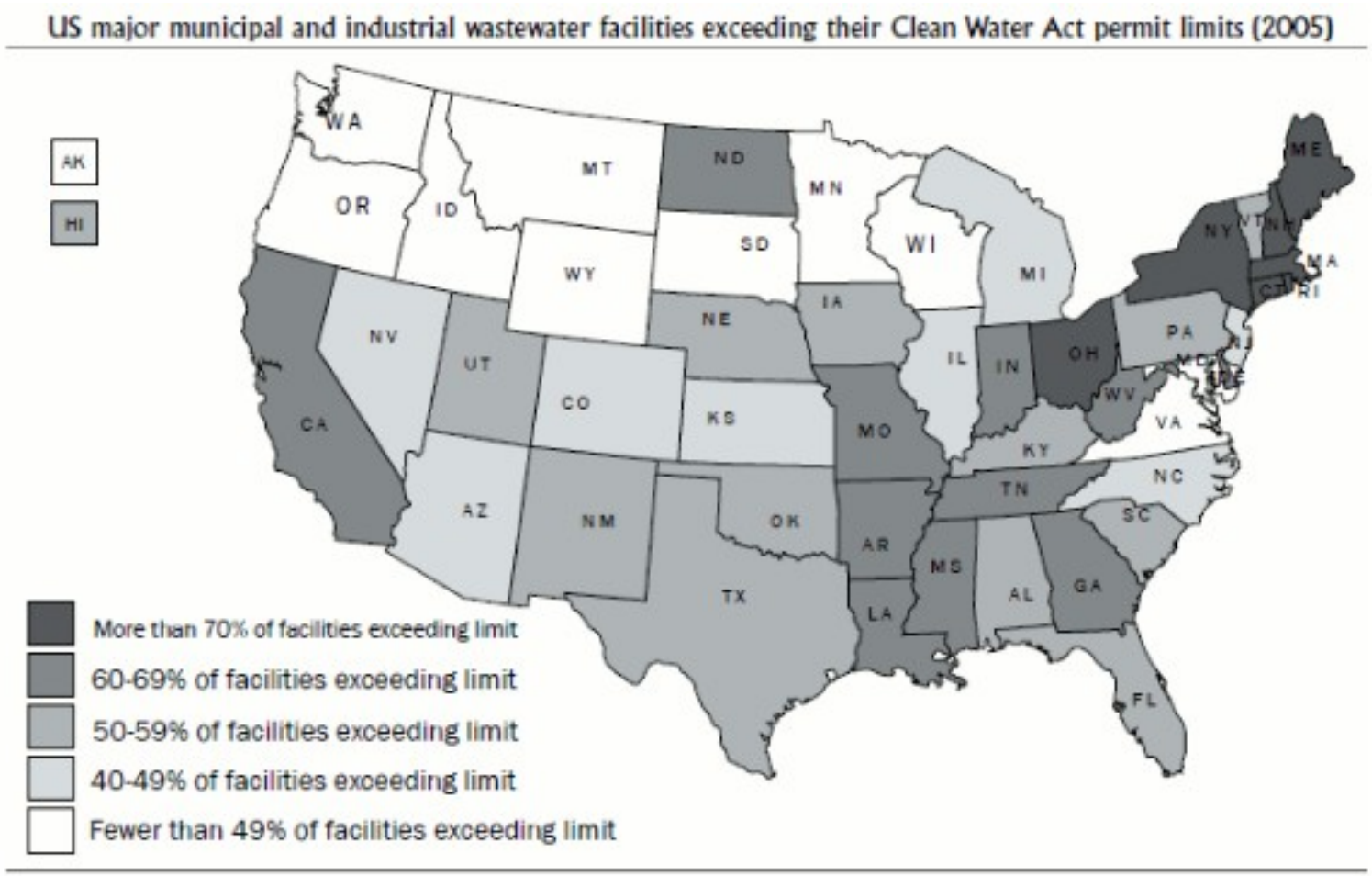
All septic systems fail?

True or False?...

False

What about a design life?
What are we comparing systems to?

Centralized System Failure Rates:



Private industry used to be the source of America's worst pollution. A survey published this month shows that municipal wastewater treatment plants are now by far the largest source of pollution in America's rivers.

The weakness of America's wastewater infrastructure was exposed this month, as a report based on Environmental Protection Agency data showed that 53% of major wastewater facilities exceeded their

Myth #8:

Stone within the drainfield provides treatment?

True or False?...

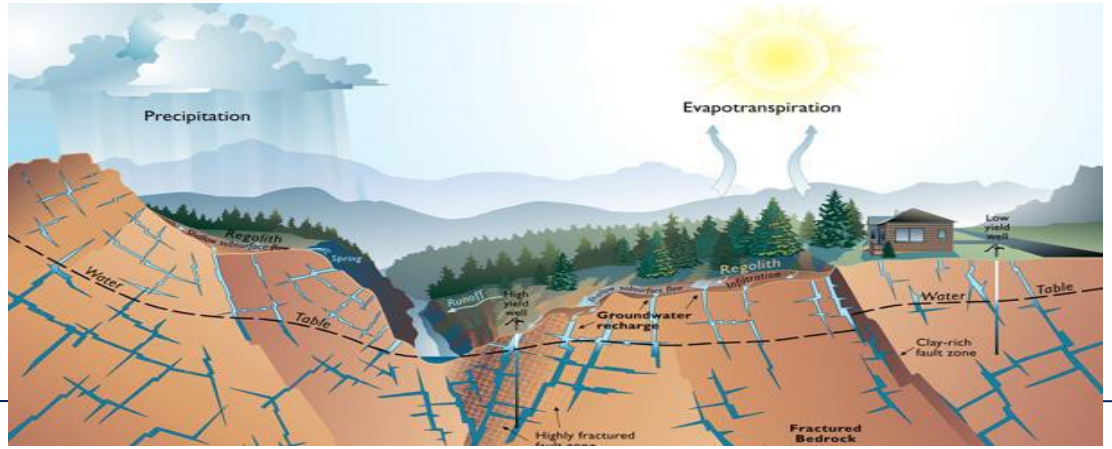
Myth #8:

Stone within the drainfield provides treatment?

True or False?...

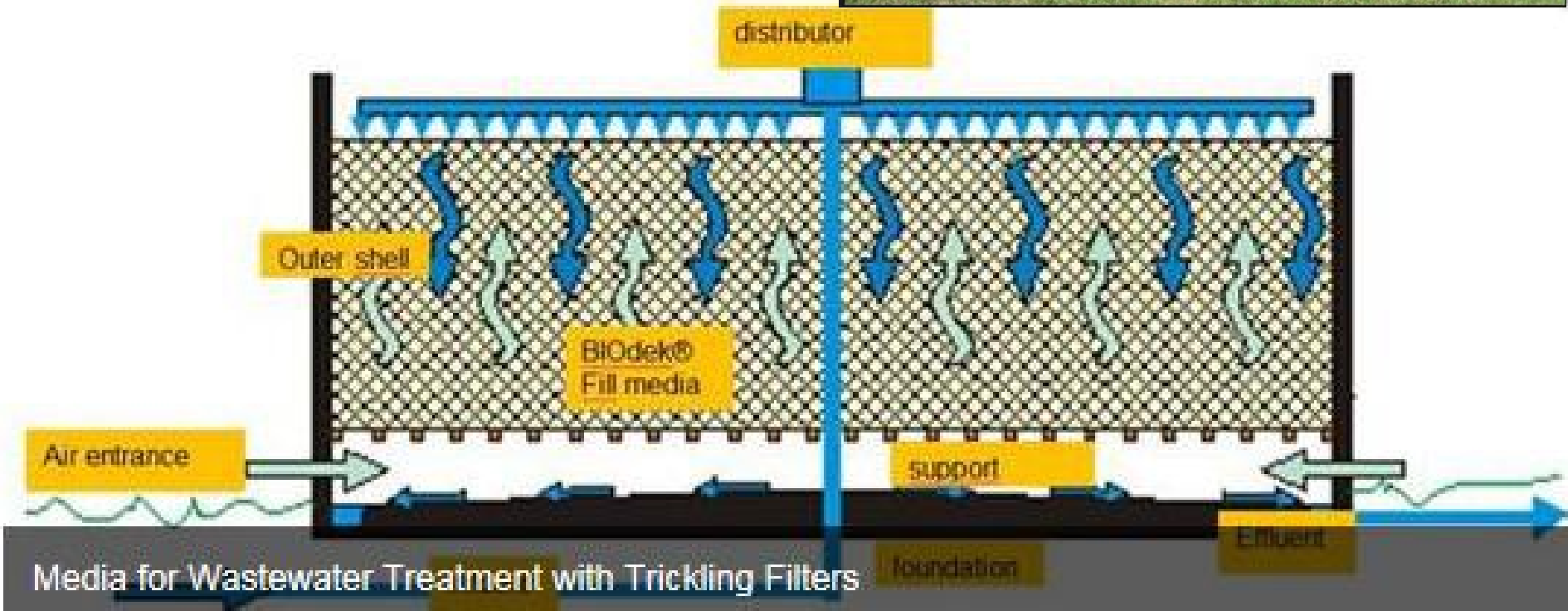
False

Why is there a separation distance to bedrock?



Is it a Trickling Filter?

Wastewater is recirculated
Air is circulated
Active Biomass is well mixed
None of these conditions are present in a drainfield.



Myth #9:

The best system is…? (can we make such a statement?)

True or False?...

Myth #9:

The best system is…? (can we make such a statement?)

True or False?...
False

There is no one best single system, each site is different, codes are different, installation difficulty, required O&M… etc.

Engineering standard – lowest cost system to meet the stated goal

Myth #10:

Sanitary sewers pollute less than decentralized systems?

True or False?...

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Sanitary sewers pollute less than decentralized systems?

True or False?...

False

What is a CSO?

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act as amended, (33 U.S.C. §§ 1251 et seq; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§ 26-53),

Springfield Water and Sewer Commission
P.O. Box 995
Springfield, MA 01101-0995

is authorized to discharge from 23 Combined Sewer Overflows (CSOs) (discharge serial numbers: **007, 008, 010-019, 024, 025, 034-037, 045, 046, 048, and 049)** (see **Attachment A** of this permit for individual outfall locations).

What do CSO's look like?

This CSO points directly at Lake Erie at the beach at a State Park. It is among hundreds locally that release untreated waste after heavy rains

This CSO in Cleveland discharged so much untreated waste after heavy rains it took on the appearance of a brown water fall.

When was the Clean Water Act Passed?

SELECTED CONSENT DECREES, 2007-2010

Municipality	Cost	Date
Northeast Ohio Regional Sewer District	$3 billion	December 2010
DeKalb County, GA	$700 million	December 2010
Jeffersonville, IN	$100 million	November 2010
Indianapolis, IN	$1.3 billion	November 2010
Toledo, OH	$315 million	October 2010
Williamsport, PA	$10 million	June 2010
Kansas City, MO	$2.5 billion	May 2010
Akron, OH	$108 million	November 2009
Hampton Roads Sanitiation District, VA	$140 million	September 2009
Lebanon, NH	$30.2 million	May 2009
Independence, MO	$35 million	March 2009
Lexington, KY	$290 million	March 2008
San Diego, CA	$1 billion	November 2007
Nashville, TN	$300 million	October 2007

Source: EPA

Over 700 communities still have combined sewers, and the EPA is on the warpath.

The EPA has made sewage spills one of its top enforcement priorities for the next several years, meaning cities with frequent combined sewer overflows (CSOs) will have to make significant investments to handle excess flow. But which regions are

13 wthr.com INDIANAPOLIS

13 Investigates

What's Floating in the River

Posted: Oct 29, 2008 4:18 PM EDT
Updated: Oct 30, 2008 10:43 PM EDT

Bob Segall/13 Investigates

Human waste is being dumped straight into local rivers and streams and 13 Investigates has the video to prove it. As part of a six-month investigation, Bob Segall travels beneath the city to show you the source of this dirty problem, the mind-boggling amount of pollution involved, and the staggering price you'll pay -- every month -- to fix it.

Indianapolis - It's a rainy fall morning and the White River looks particularly murky.

There's good reason.

The dark, sludgy stuff that's floating down the river is coming straight from someone's toilet.

Dirty little secret?

No.

Indianapolis and more than 100 other Indiana towns openly admit they dump human waste into scenic rivers and streams.

But 13 Investigates found few people know how, when or why this problem is happening. And like most other Hoosiers, you probably don't realize how much raw sewage is being dumped and the huge price you'll be paying to bring the problem under control.

Overflow!

Outdated sewers are to blame for the massive problem.

Indianapolis and many other Midwestern cities built their sewer system almost 100 years ago. Back then, sewers were designed to handle both wastewater from your home and storm water from the street together in the same sewer pipes. The "combined sewer" lines lead to each city's wastewater treatment plant, and they work well -- as long as it doesn't rain.

But during a rainstorm, hundreds of millions of gallons of rainwater quickly rush into the combined sewers. To prevent the


Raw, untreated sewage pours into Fall Creek.


A boy swims in the White River less than 24 hours after the river was polluted by multiple sewer overflows.


This water sample taken from the White River contained 39,726 colonies of E-coli bacteria.


Mark Jacob says sewer rates will jump dramatically over the next decade to reduce the number of sewer overflows in Indianapolis.

How many inches of rain cause sewers to overflow?

1. Over 3”
2. 1.5”
3. 1.0”
4. ¼”

EPA Consent Decree Resulted in collection tunnels, when completed there will still be an estimated 600 million gallons of CSO’s

To fund this rates will go from $15/month to $100/month

From U.S. News:

- **"…municipal sewers, with little public recognition, are overflowing or breaking down with disturbing regularity, releasing mega amounts of pollutants."**
- **San Diego had a raw sewage spill of 34 million gallons and small-town Fort Pierce, Fla., was hit with 8 million gallons.**
- **A downpour prompted the Milwaukee sewer authority to discharge more than a billion gallons of raw sewage into area waterways and Lake Michigan.**

- **All told, the EPA projects that combined sewer overflows (or CSOs) discharge 1.2 trillion gallons of sewage a year.**

Comparison of Failures…

Let's do the math:

EPA Estimated "reported" overflows: **1.2 TRILLION** gallons per year

How many onsite systems does this equate to?

- 2010 Census: 2.6 people per home
- 60 gpd/person = 156 gpd/home
- **1.2** Trillion gal/yr = 3.9 Billion gal/d
- 3.9 BGD/(156 gpd/home) = 25M homes

So… this equates to over 25 million homes failing continuously every day!
Which is better for the environment?…

Sustainability?... InSanitation

TABLE 1 ★ Annual Capital Gap for Water Infrastructure in 2010, 2020, and 2040 *(billions of 2010 dollars)*

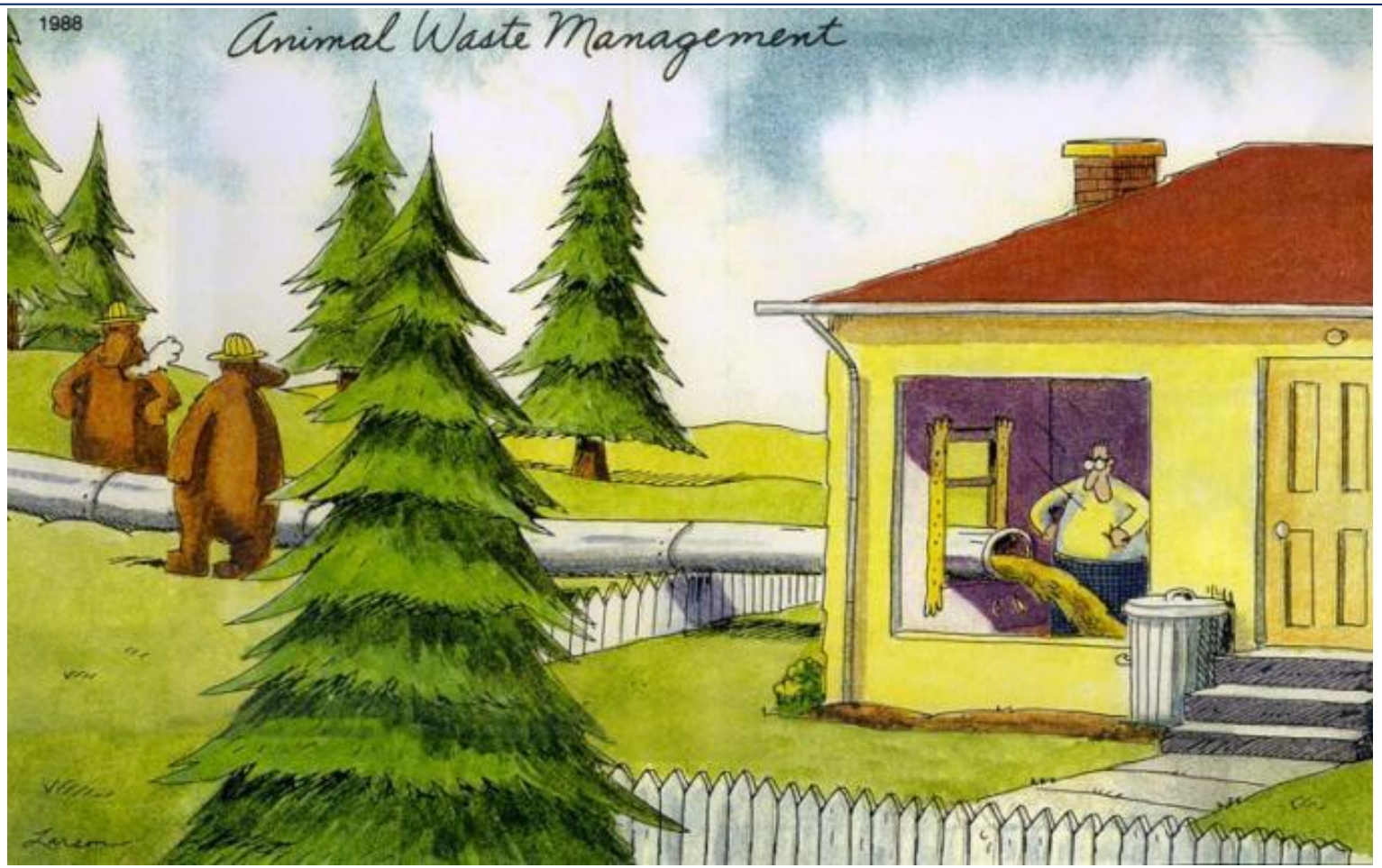
YEAR	SPENDING	NEED	GAP
2010	36.4	91.2	54.8
2020	41.5	125.9	84.4
2040	51.7	195.4	143.7

SOURCES Needs calculated from EPA (1997a, 1997b, 2001, 2003, 2005, 2008, 2009, 2010). Spending calculated from CBO (2010) and USCB (2011a, 2011b).

In Conclusion:

- **There is no longer “one solution” in wastewater treatment, Decentralized Systems can be effective solution**
- **Get involved locally – You can make a difference**
- **Put an end to the Myths**

Thank You… Questions ?



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