EPA's MOU Partnership

Improving Communication, Cooperation, and Coordination in Decentralized Wastewater Management

Welcome to the MOU Partners!

- EPA supports wastewater management strategies that minimize public health and environmental risks, and decrease costs
- The MOU group provides a venue for promoting professionalism and consistency

First MOU Signing Ceremony, January 2004

Purpose of the Webinar

- Introduce new MOU Partners to EPA's Decentralized Wastewater Management Program
- Provide orientation on individual/cluster system technologies and management options

EPA's Decentralized WW Program

- Promotes better management for individual and small cluster systems
  - Includes planning, design, installation, operation, maintenance, enforcement, record-keeping, personnel training, etc.
- Promotes equitable consideration of centralized and decentralized options
  - Option selected should be based on environmental risk, cost, other parameters

Original MOU Partners

- Consortium of Institutes for Decentralized Treatment (CIDWT)
  - Bruce Lesikar, Board Member
- National Environmental Services Center [(NESC) National Small Flows Clearinghouse)]
  - Dr. Gerald Iwan, Director
- National Environmental Health Association (NEHA)
  - Dr. Welford C. Roberts, President-Elect
- National Association of Towns and Townships (NATaT)
  - Keith Hite, President – sending representative
- National Association of Wastewater Transporters (NAWT)
  - Tom Ferrero, Executive Director
- National Onsite Wastewater Recycling Association (NOWRA)
  - Tom Groves, President
- Rural Community Assistance Program (RCAP)
  - Robert Stewart, Executive Director
- Water Environment Federation (WEF)
  - Bill Bertera, Executive Director

New Partners

- Association of State Drinking Water Administrators (ASDWA)
  - Jim Taft, Executive Director
- Association of State and Interstate Water Pollution Control Administrators (ASIWPCA)
  - Linda Eichmiller, Executive Director
- Association of State and Territorial Health Officials (ASTHO)
  - Paul Jarris, MD, Executive Director – sending representative
- Ground Water Protection Council (GWPC)
  - Michael Paque, Executive Director
- State Onsite Regulators Alliance (SORA) via NESC
  - Russell Martin, State of Maine Dept. of Health
- Water Environment Research Foundation (WERF)
  - Glen Reinhardt, Executive Director

Partner activity areas

- Communication and coordination
  - Conference calls, email, events, conferences
- Training for service providers
  - Installers, inspectors, other providers
- Collaboration on joint projects
  - Research, meetings, outreach

Signing Ceremony

- November 19, 2008 from 10:00-11:30am EST in EPA East, Room 1153

Annual Meeting

- Annual MOU Partner Meeting to follow the signing ceremony
- November 19th from 1:00-5:00pm and Nov. 20th 8:30am-12:30pm

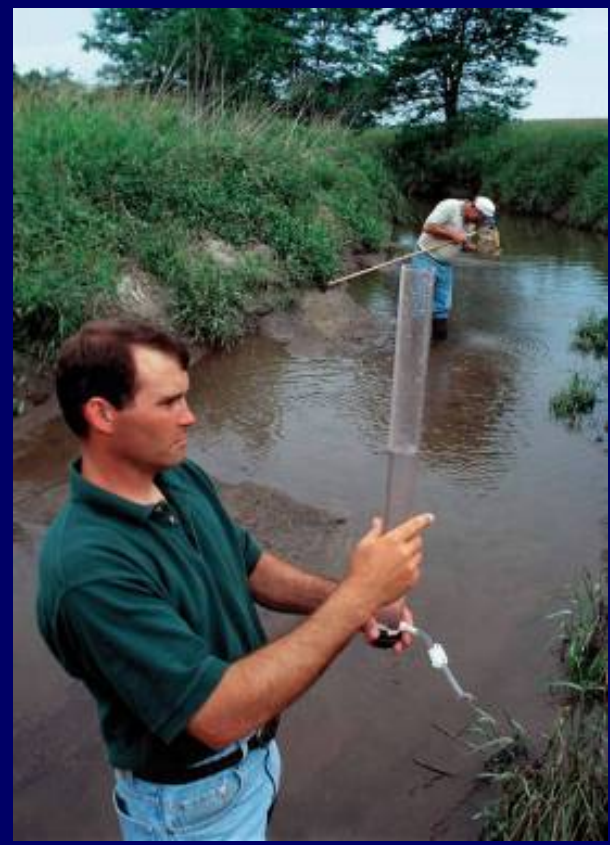
Orientation on decentralized wastewater treatment technologies & management

- Wastewater pollutants and impacts
- Treatment technologies & options
- Management approaches

Presented by Barry Tonning, Tetra Tech

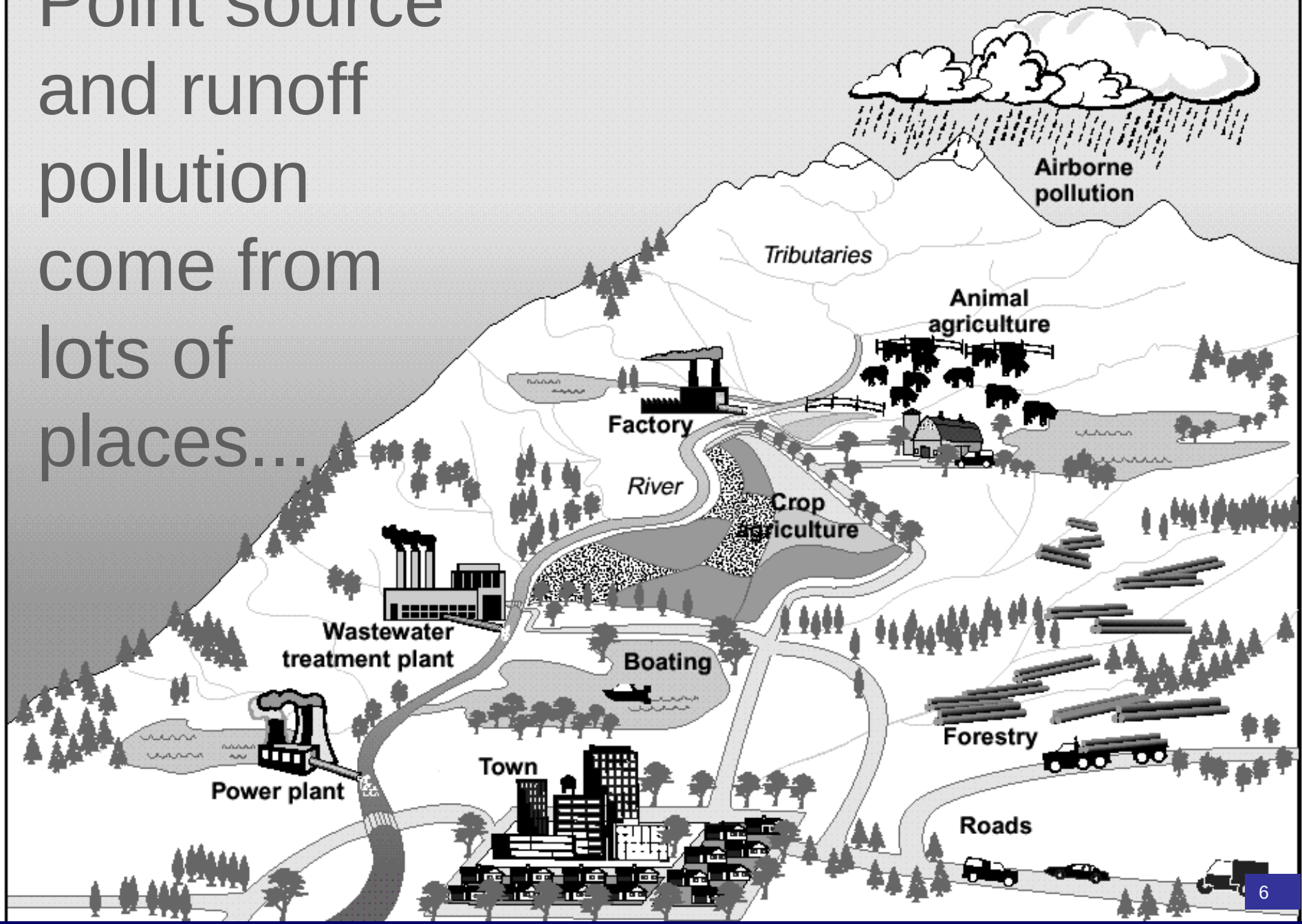
Condition of U.S. surface waters

- Pollutant-impaired waters include* :
  - 45% of assessed rivers and streams
  - 47% of assessed lake acres
  - 32% of assessed bay and estuarine square miles
- Polluted (nonpoint) runoff is mostly to blame
- Chief causes are nutrients, pathogens, and sediment



*National Water Quality Inventory, 2002 Reporting Cycle. About 30% of U.S. waters were assessed by the states for this report.

Point source and runoff pollution come from lots of places...

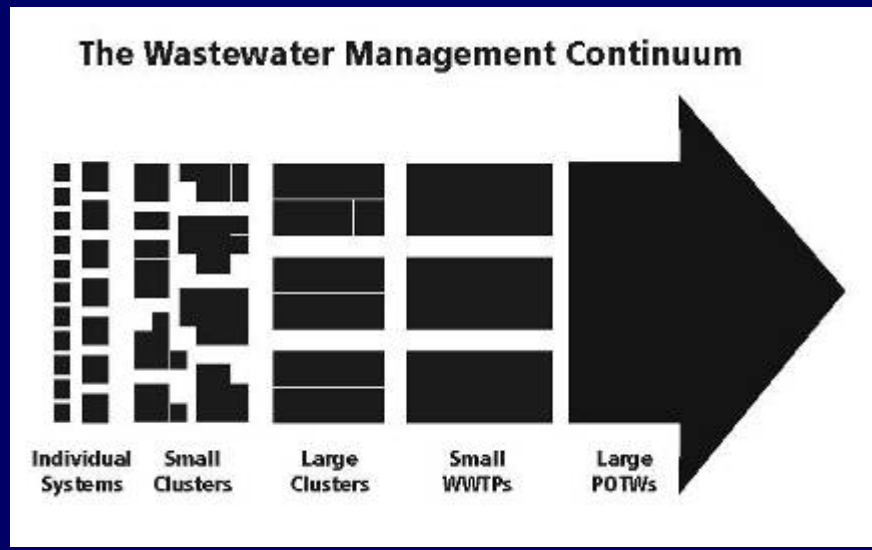


Wastewater pollutants of concern

- Pathogens – bacteria & viruses mainly; plus protozoa, worm eggs
- Nitrogen – causes algal growth in nitrogen-limited (mostly coastal) waters; nitrate can cause “blue baby” syndrome
- Phosphorus – causes algal growth in P-limited (mostly inland fresh) waters
- Others – pharmaceuticals, cleaners, solvents, & other toxics (most of which affect treatment processes)

Sewage treatment

- What are the options?
  - Individual onsite “septic” or advanced wastewater treatment systems
  - Clustered systems with soil infiltration
  - “Package” plants with ditch/stream discharge
  - Centralized plant with lake/river/ocean discharge

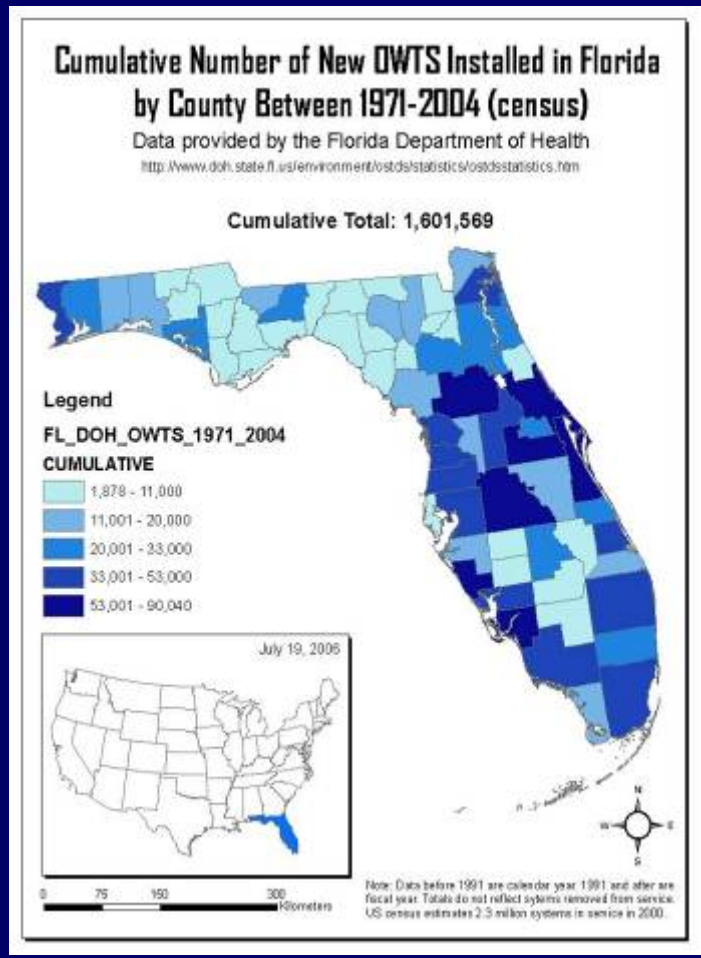


Centralized treatment plants

- Most discharge to rivers, lakes, streams, ocean, & need state/federal NPDES permit
- Centralized treatment can result in better operator attention and mgmt
- Good option for high-density development
- Efficiencies related to economy-of-scale

Decentralized soil-discharging systems

- Individual systems
  - Septic tank with gravity flow
  - Tank with pressure dosing
  - Advanced systems with dosing
- Clustered systems
  - Each home has a tank
  - Effluent collected via gravity or pumped
  - Multiple options for treatment facility
  - Dosed or gravity flow dispersal



Centralized plants – downsides

- Some older plants have CSOs or SSOs
- New regulations forcing higher treatment levels
- Upgrades & expanded collection systems costly:
  - ~ $20 to $60K per home
- Unused capacity = poor use of public funds
- Local opposition to siting some new plants

Decentralized treatment – downsides

Septic system malfunction impacts

- 2800 TMDLs (43% of the total) in US EPA ATTAINS database mention septic systems
- 651 of these septic system TMDLs are in coastal states
- States list septic systems as a major source of groundwater contamination, a source of bacteria & nutrients, & source of impairment/ threats to surface waters

States citing septic systems in TMDLS

- Ohio – 1235
- New Jersey – 244
- Illinois – 148
- Indiana – 117
- Kansas – 111
- Tennessee – 99
- Oklahoma – 72
- Alabama – 57
- New York – 50
- Michigan – 43
- Washington – 23

In Rowan County watersheds

Contamination linked to faulty residential sewage systems

Bacterial contamination linked to faulty residential sewage systems has been detected throughout the Clearfield Creek and Dry Creek watersheds in Rowan County, according to officials from the Gateway District Health Department.

District Health Planner David Daniels said last week that a study of creek water in the area had confirmed what many residents have long suspected: extensive contamination from fecal coliform bacteria, some of which may cause diarrhea, nausea or other diseases.

The study, which was conducted through the cooperative efforts of MSU's Water Testing Laboratory, the health department and the college's Environmental Science Club, found bacterial contamination on Clearfield Creek from the foot of Clack Mountain to the confluence with Triplett Creek near the KY 519 bridge. Contamination was found at all six sampling sites along the main stem of Dry Creek, which flows into Clearfield Creek. The highest coliform readings were detected at the KY 1167 bridge, just a few blocks northeast of Clearfield Elementary School.

"In light of the bacterial contamination found along the two creeks, we would advise that people in the area avoid contact with creek water if at all possible," Daniels said. "While the presence of fecal coliform bacteria does not necessarily mean that disease-causing bacteria are present, it does indicate that they could be. Sewage contains a number of organisms that can cause hu-

√ Turn to CONTAMINATION
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Contamination linked to faulty residential sewage systems

FROM FRONT PAGE

man illness, and contact with sewage-contaminated water should be avoided."

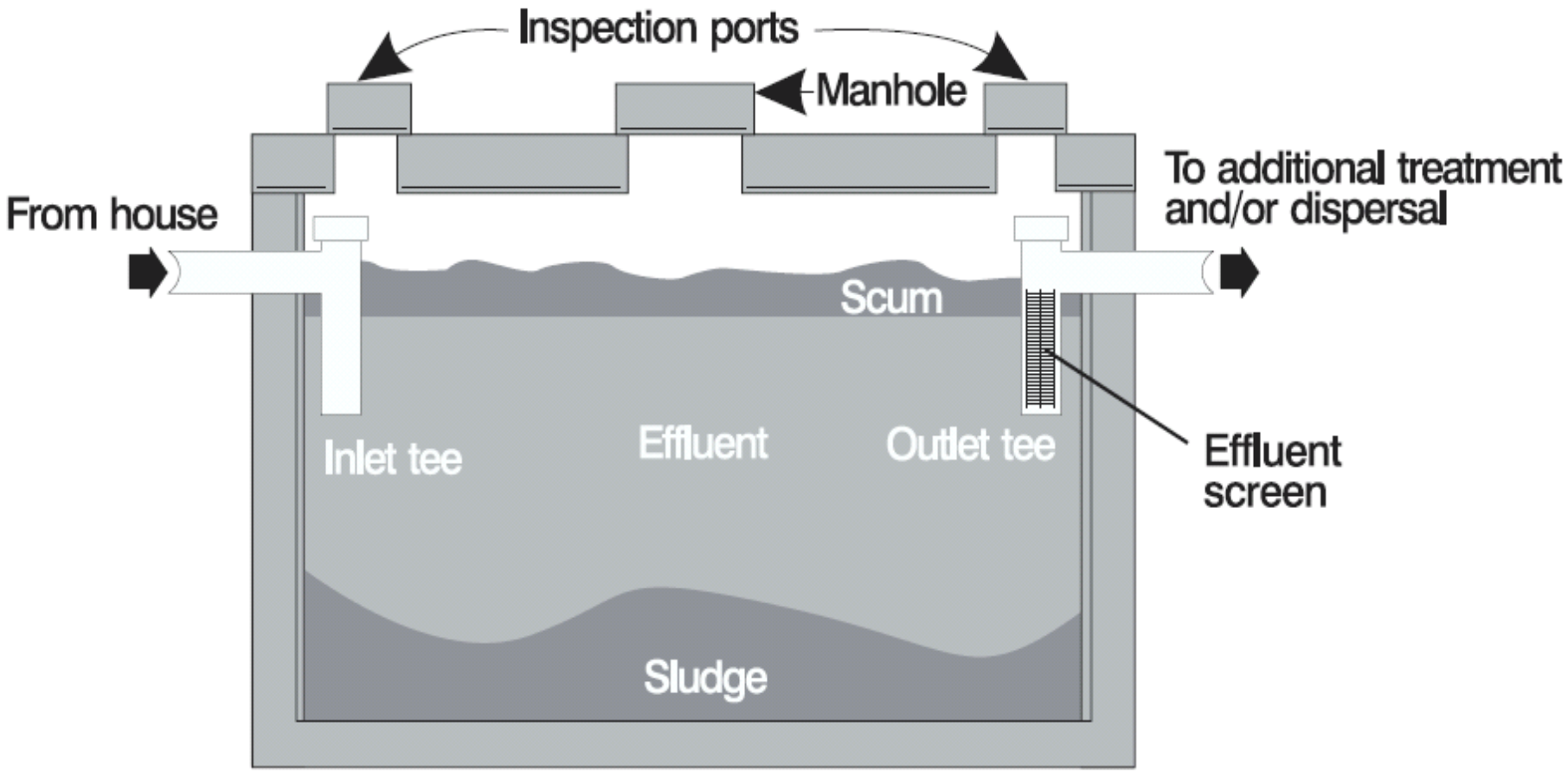
In a letter to Daniels, MSU Water Testing Lab Director Ted Pass noted that "the Leisure Lane, Cardinal Lane, Cedar Creek Village and Highway 1167 bridge samples are highly contaminated with fecal substance of human origin." In addition, high

Overview of treatment processes

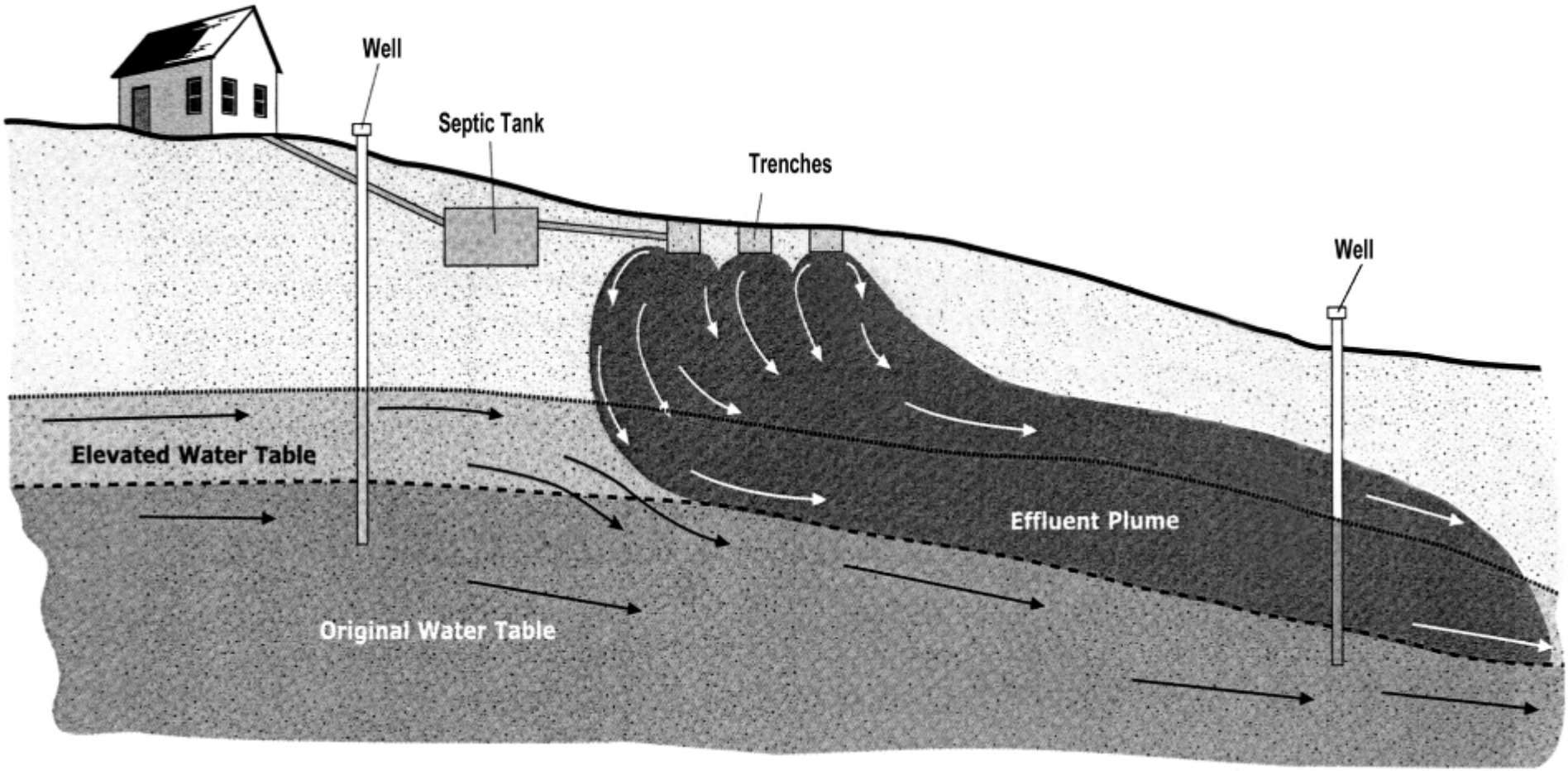
- Bacteria & other pathogens
  - Biological death, predation, & decomposition outside host (i.e., in soil)
- Phosphorus
  - Some retention in tank, soil adsorption
- Nitrogen
  - Ammonia nitrified in treatment unit or soil; poor denitrification of nitrate w/o anaerobic step
- Suspended solids
  - Settling out in tank & in treatment unit sludge; filtration by soil
- Other pollutants
  - Aerobic soil environment helps degrade organics; treatment of other pollutants uncertain

Septic tank & treatment processes:

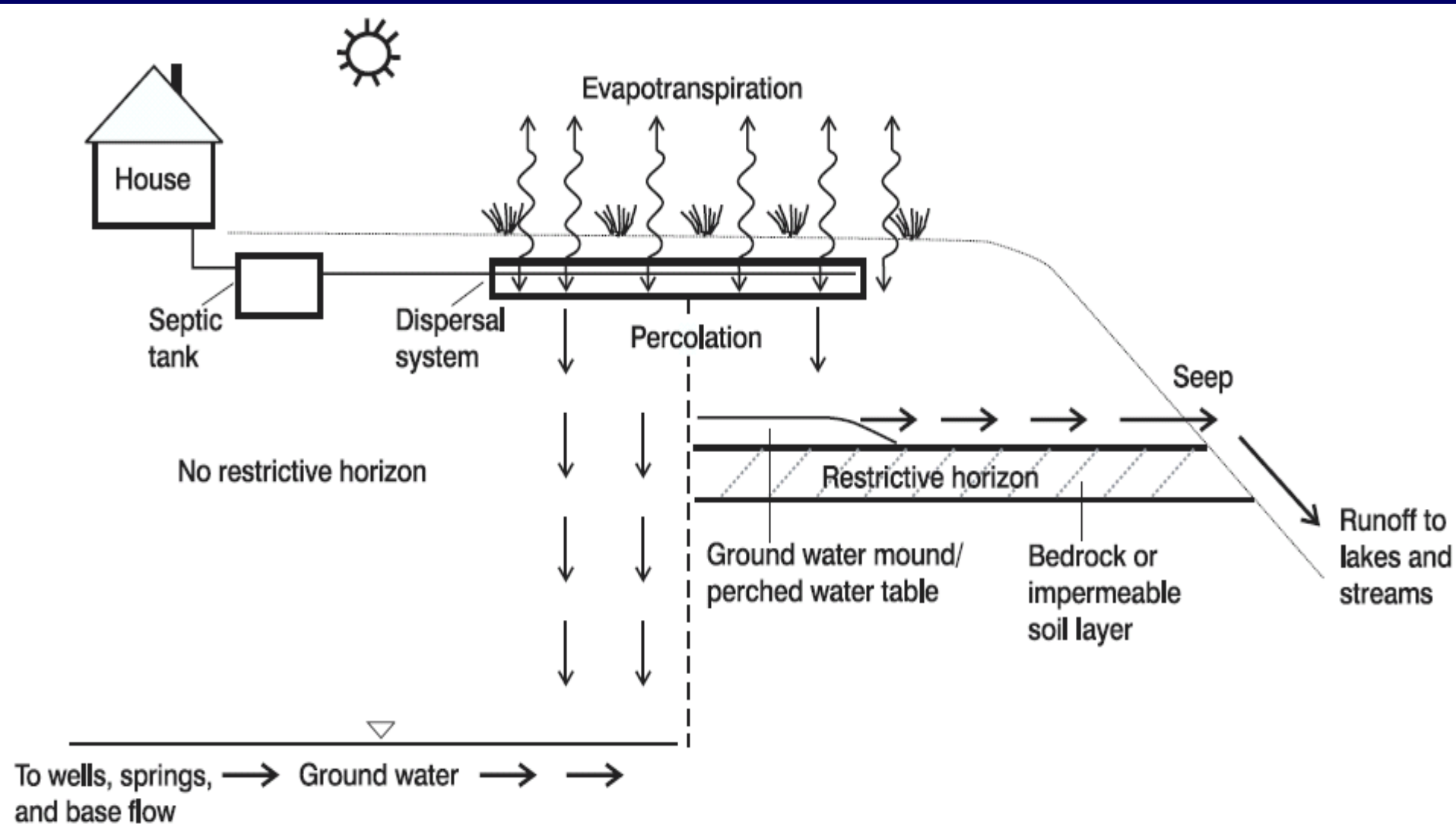
Retains fats, oils, grease, & settleable solids, with some anaerobic decomposition



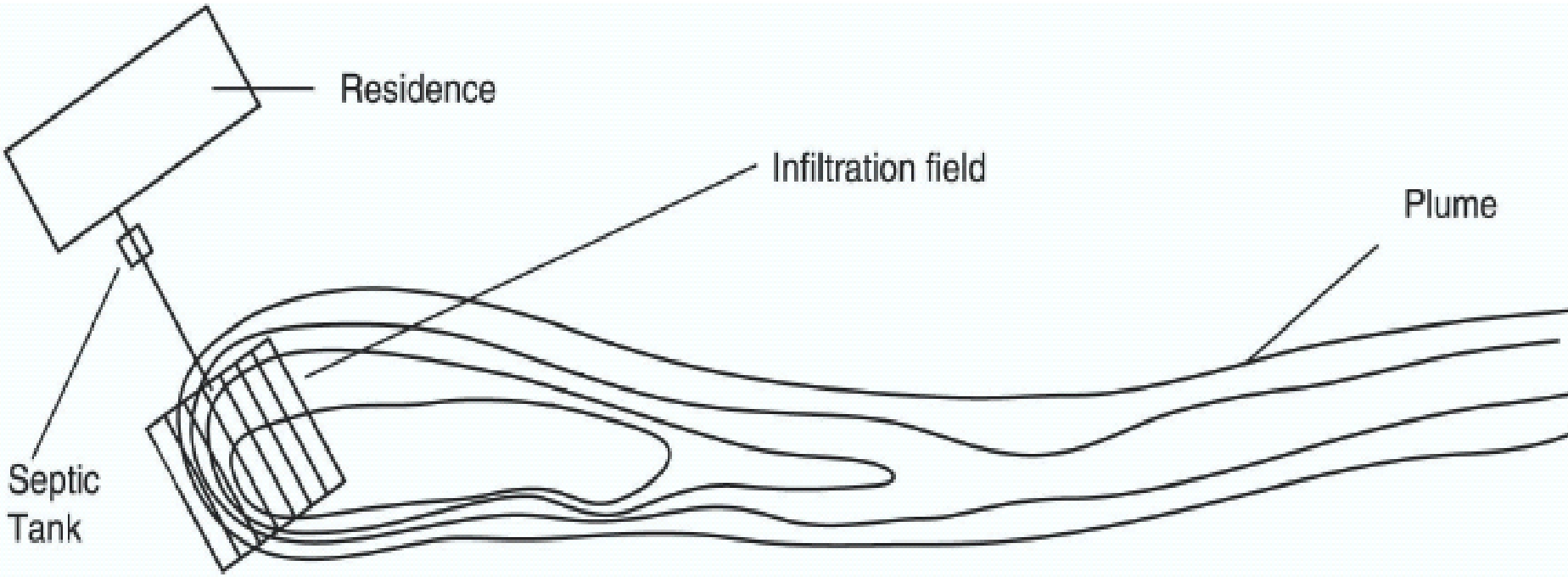
Effluent movement through soil



Water movement & treatment processes in the soil



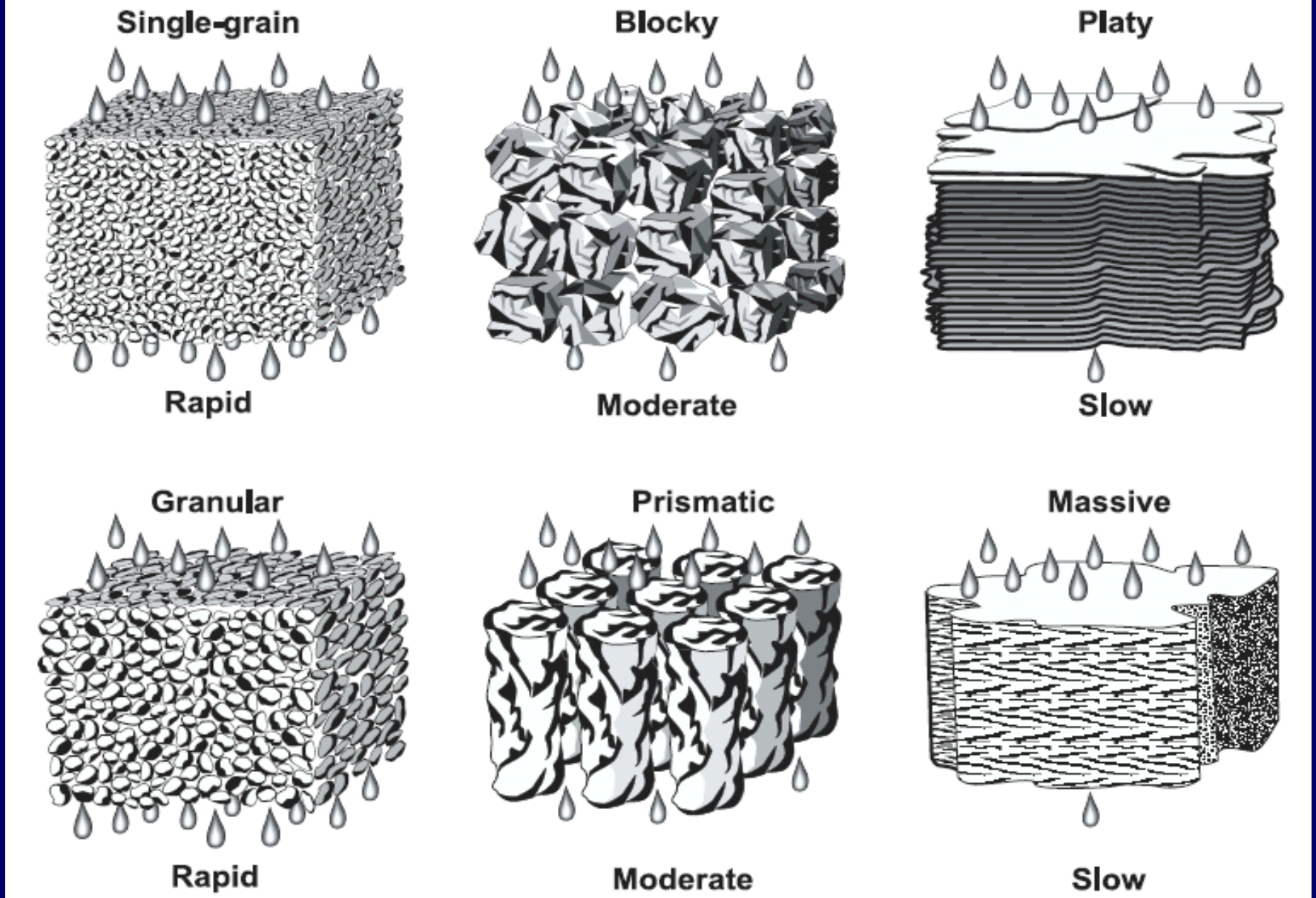
Effluent plume will move through soil based on soil properties, groundwater depth and gradient, and flow rate from treatment system



Soil properties:

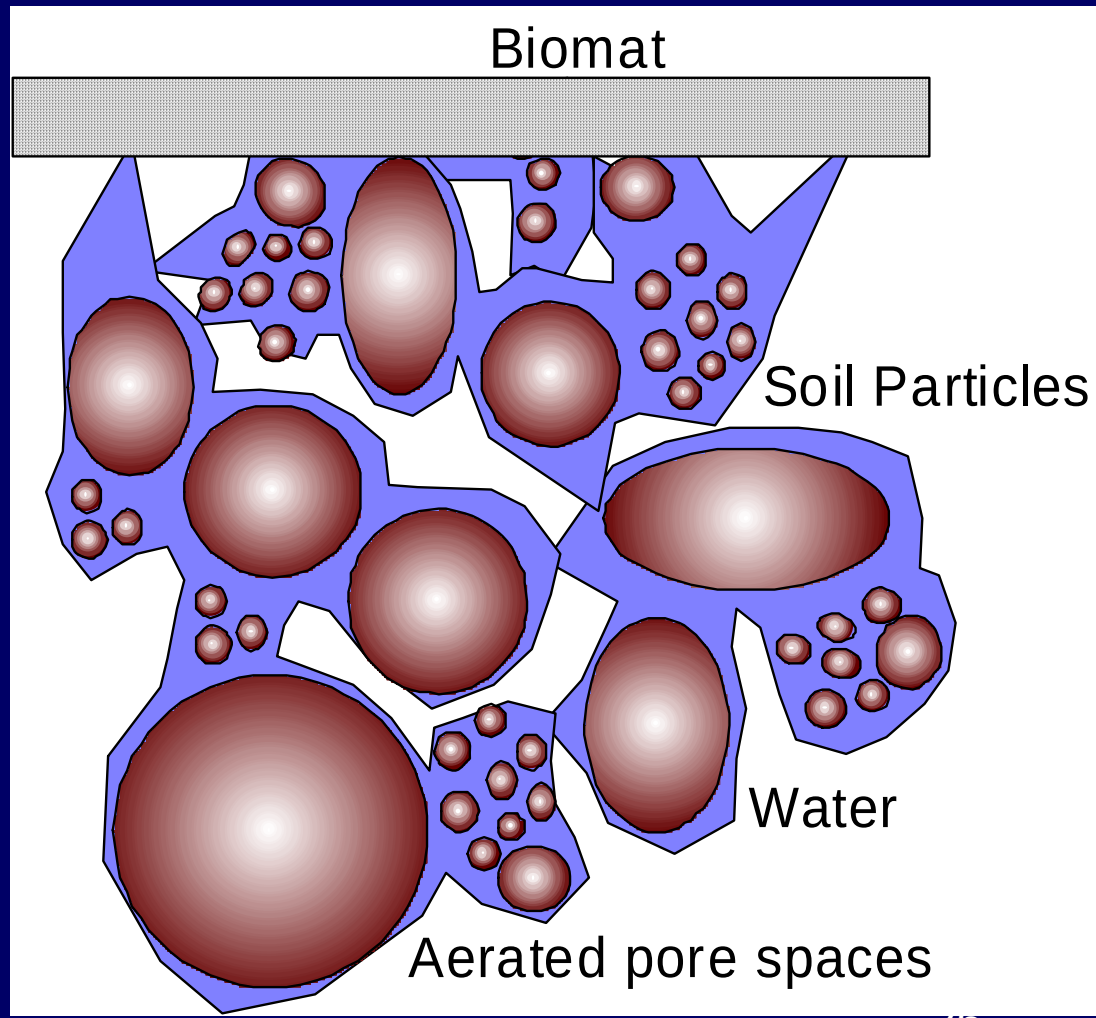
Most important treatment system component for soil-discharging systems!

Soil structure categories



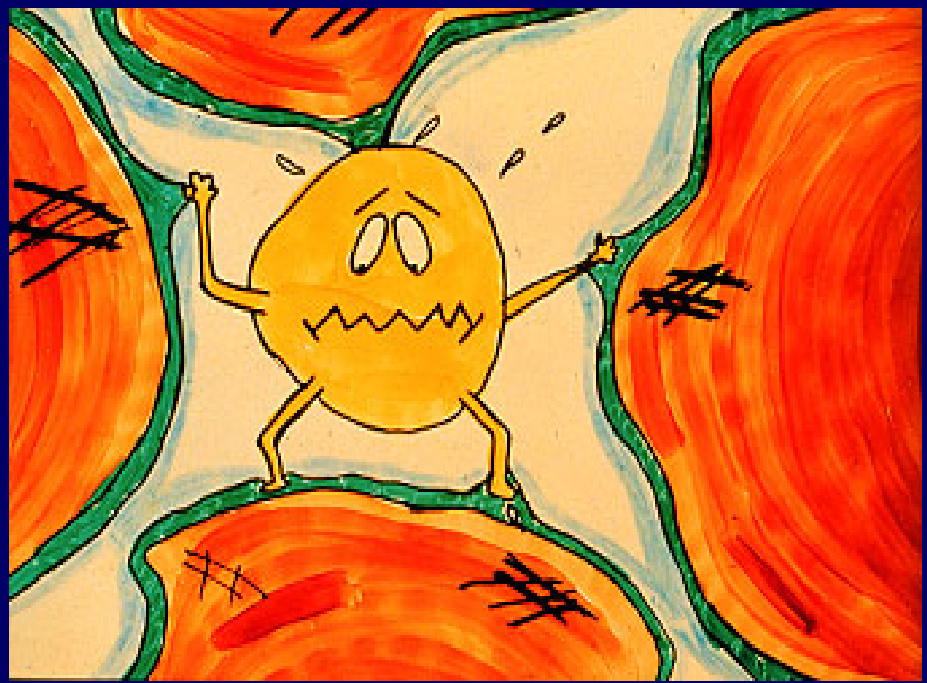
Treatment in the soil

- Unsaturated soil maintains oxygen transfer needed for organic decomposition
- Also maintains effluent flow rate through the soil, for maximum soil contact

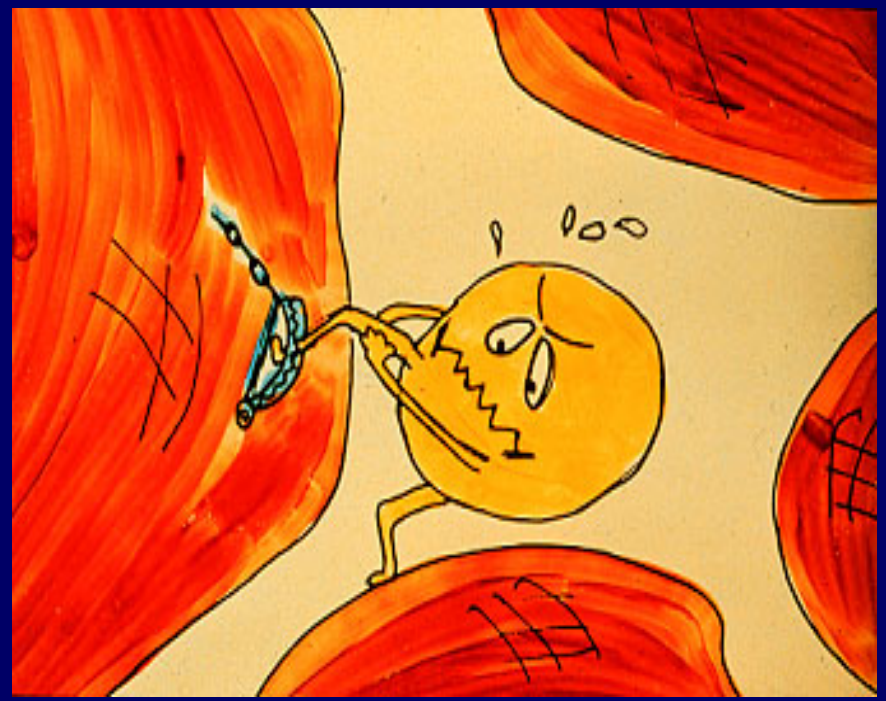


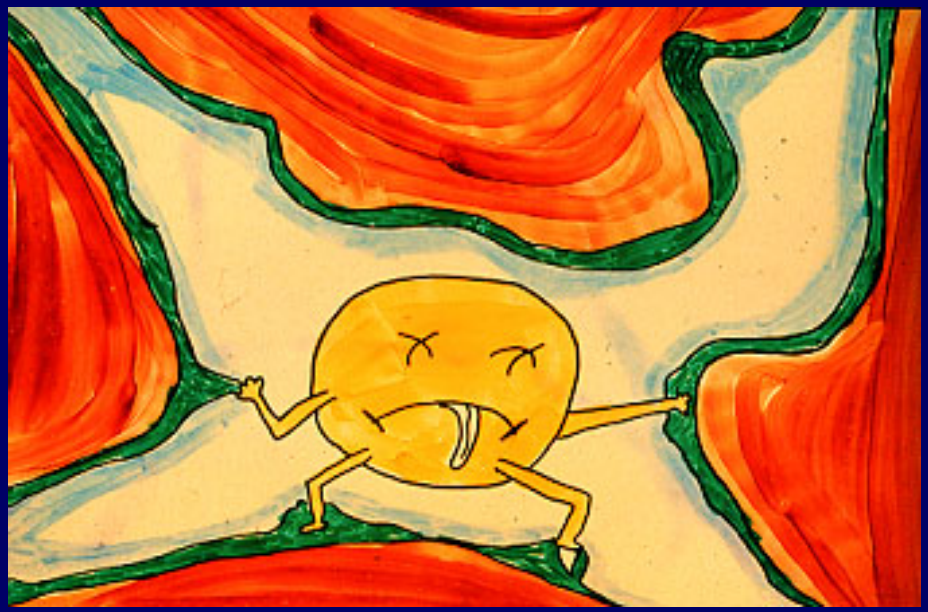
Pathogen treatment in soil

Flow through soil

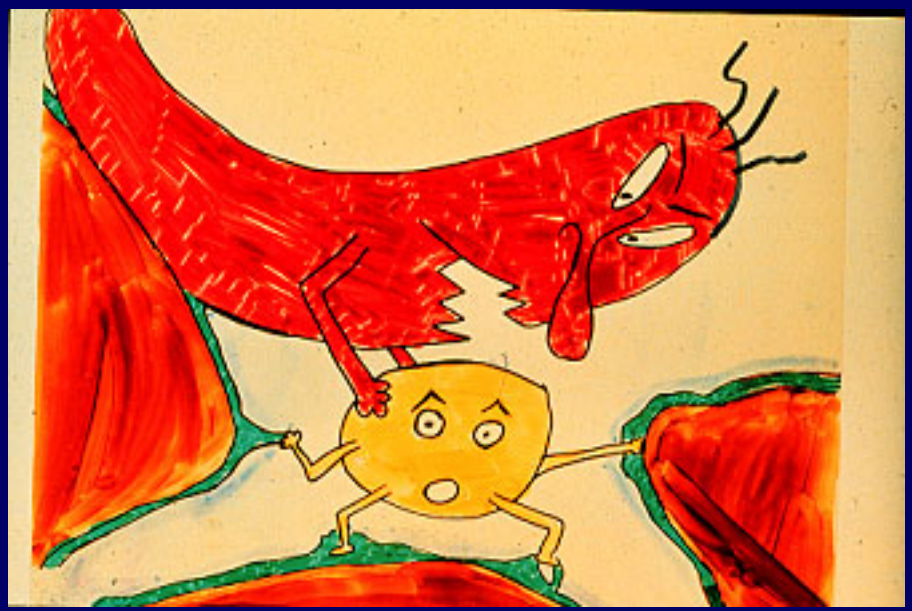


Attached to particles





Stuck!!



Attacked!!

Wiped out!!

Soil treatment of septic tank effluent at varying soil depths

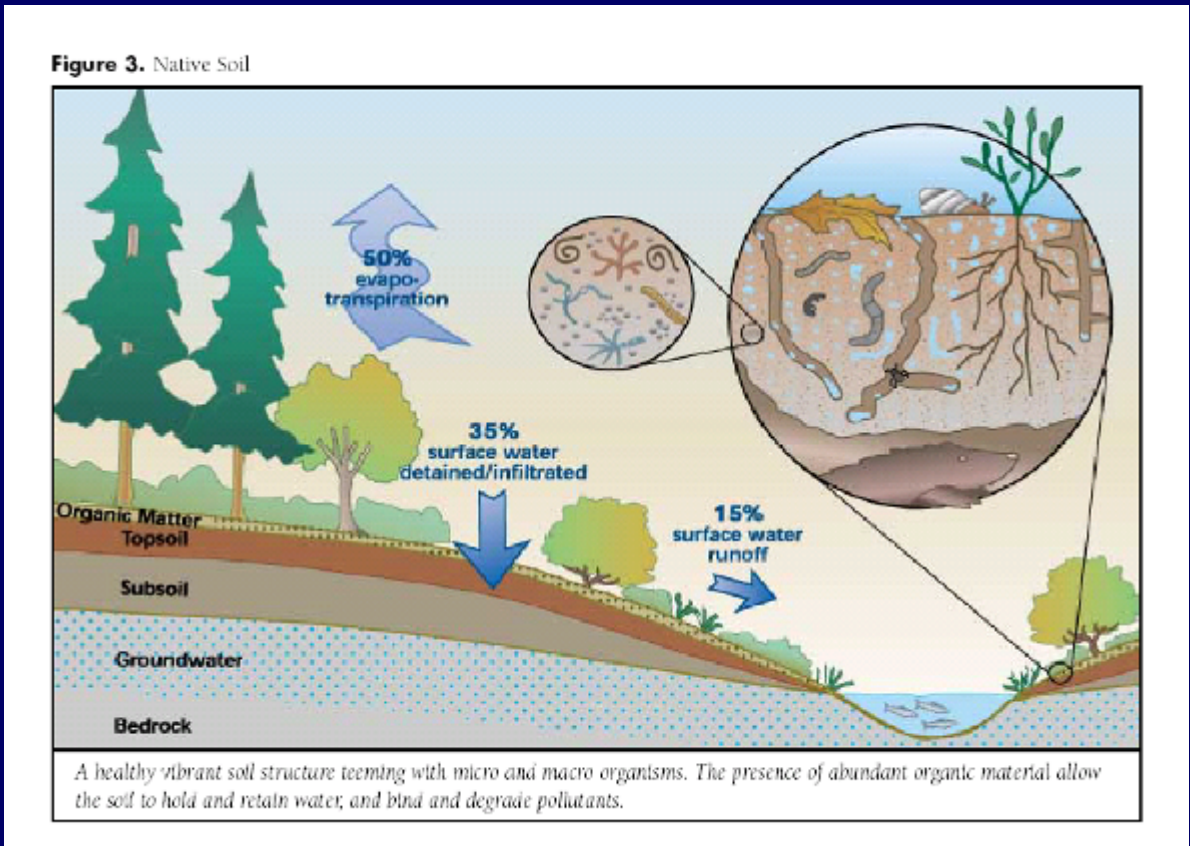
Pollutant Parameter	Tank Effluent	Avg. after 24" soil filtration	Avg. after 48" soil filtration
BOD (mg/l)	93.5	<1	<1
$N0_3$-N (mg/l)	0.04	21.6	13.0 – 29.0
TP (mg/l)	8.6	0.4	0.18 – 1.8
F. Coli (log #)	4.57	No detect	No detect
F. Strep (log #)	3.6	No detect	No detect

Soil properties to consider

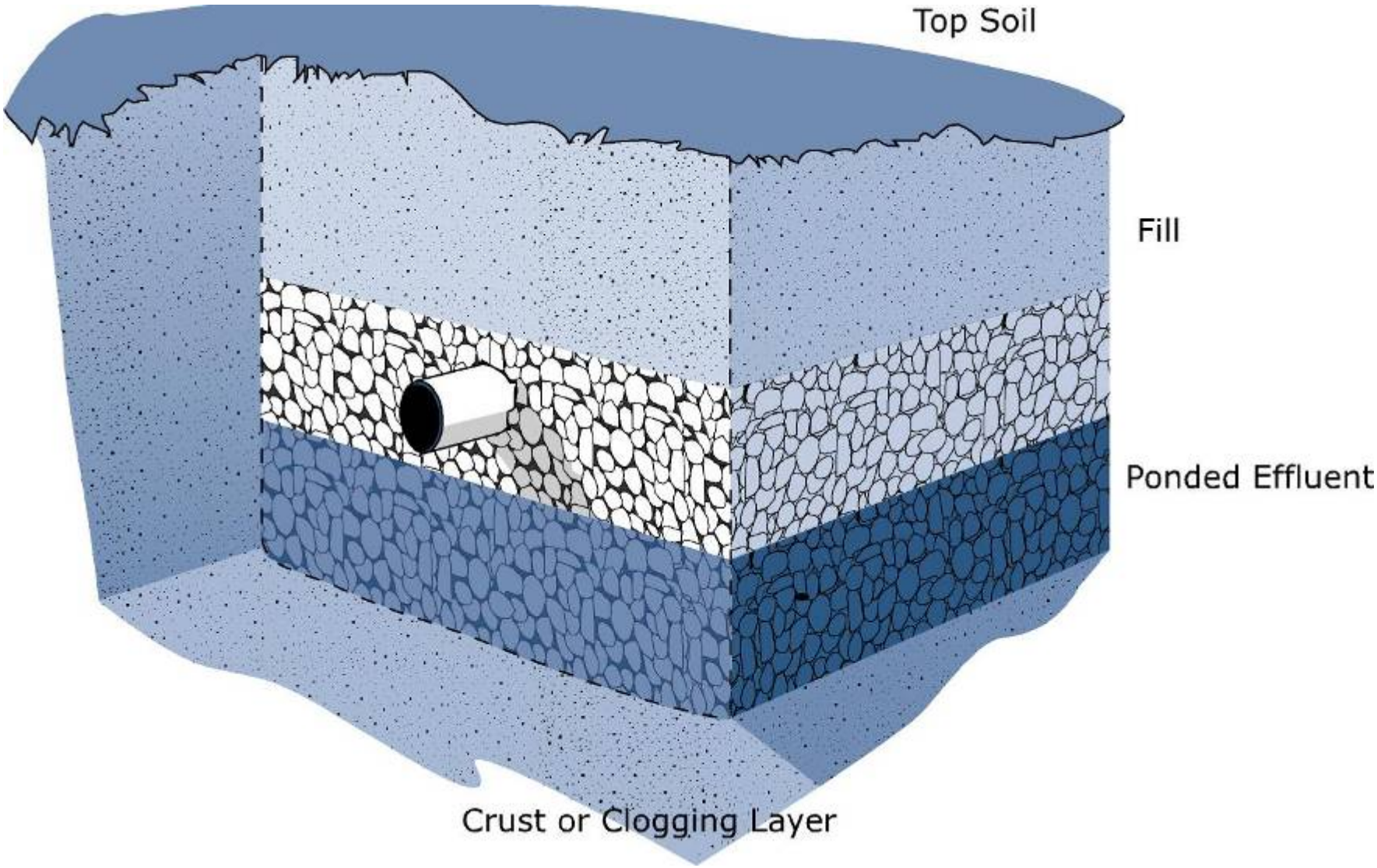
- Depth – unsaturated soil depth
- Horizons – layers with similar properties
- Texture – sand/clay/silt mix (permeability)
- Structure – granular, angular, platy, etc.
- Color – indicates minerals, redox, etc.
- Consistence – cohesion / plasticity
- Restrictive horizons – penetration resistance
- Others – organic content, P adsorb potential, etc.

Soil treatment design challenges

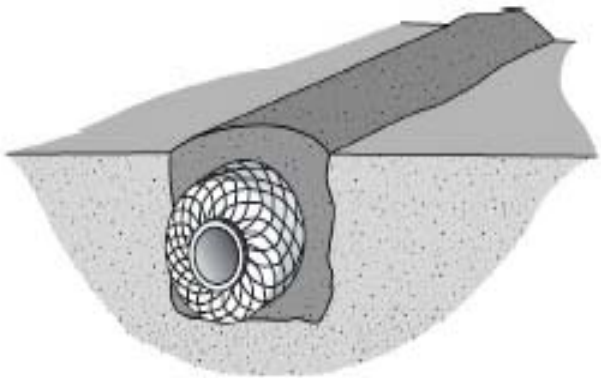
- Poorly drained or compacted soil
- High groundwater table
- Nitrate & phosphorus loading
- Steep slopes
- Large rocks
- Rapid flow



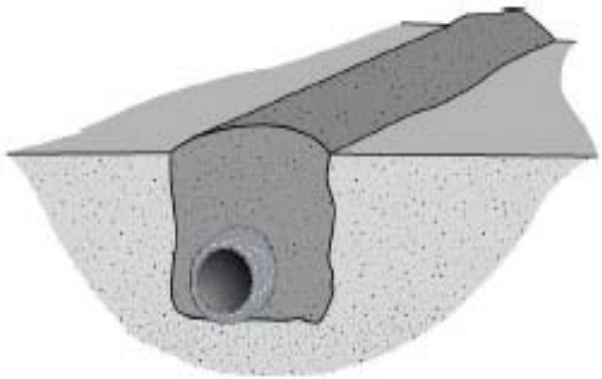
Conventional drainfield trench



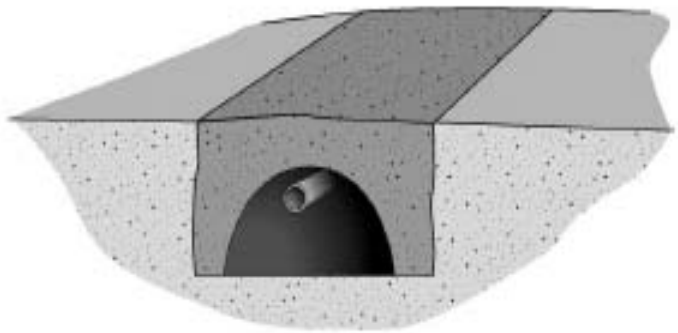
Gravelless wastewater infiltration options



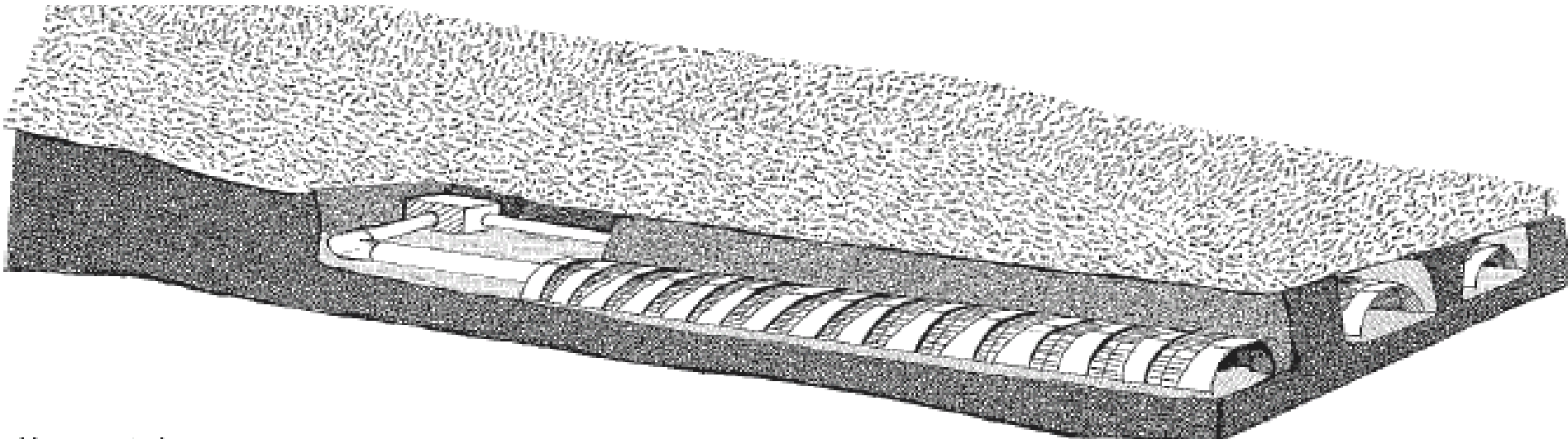
Polystyrene
Wrapped Pipe



Geotextile
Wrapped Pipe



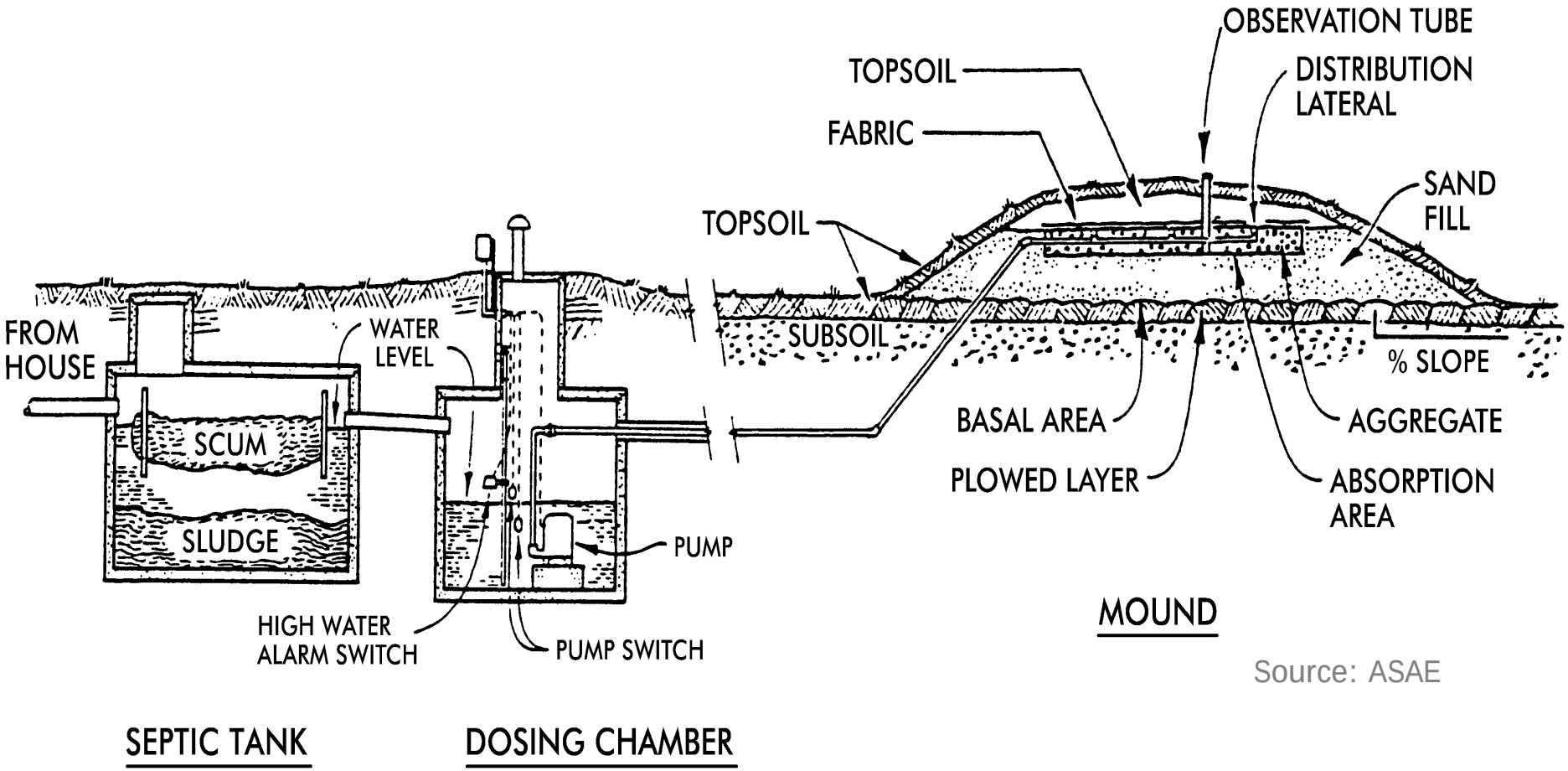
Chamber



Beyond the “box & rocks” systems

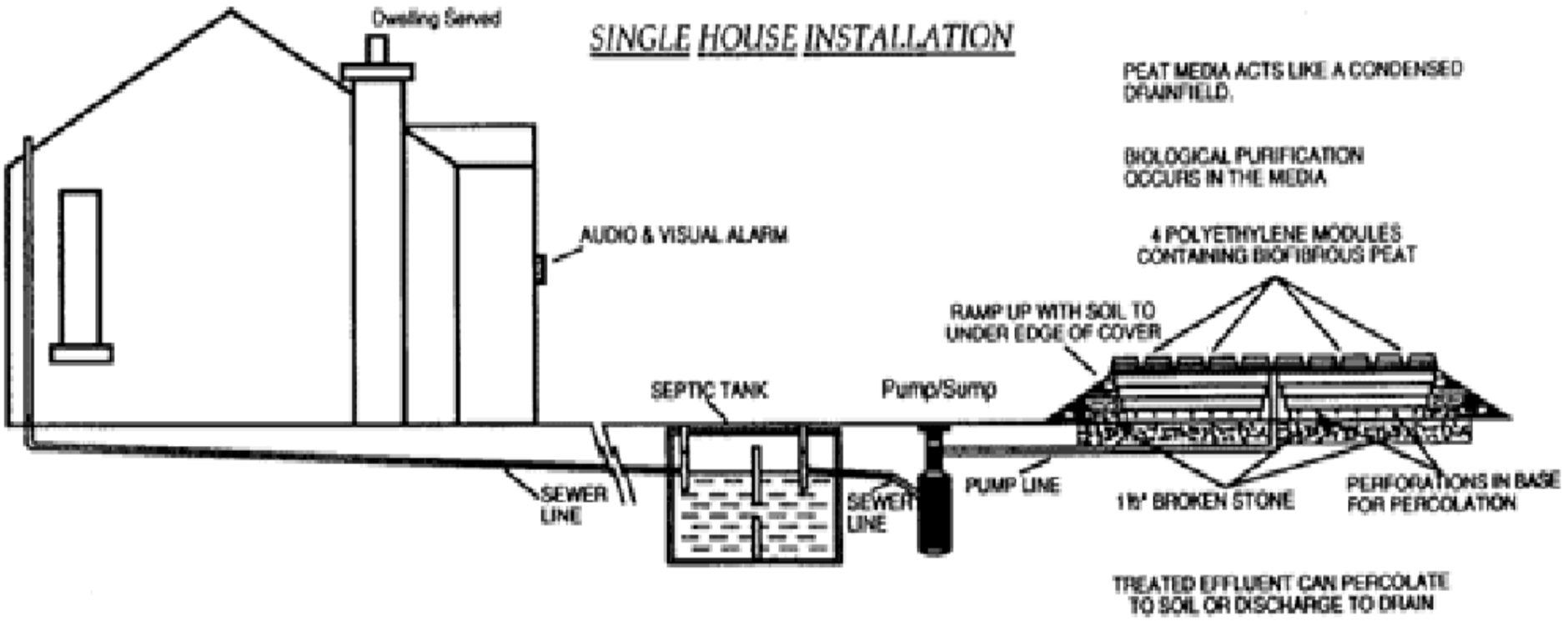
- Package & site-built units provide additional treatment for septic tank effluent
  - Usually requires tank for primary treatment
  - Can discharge to soil or surface waters (with NPDES permit)
- Treatment processes include:
  - Suspended growth biological treatment, followed by settling tank & disinfection (if discharging to surface waters)
  - Fixed film biological treatment, followed by filtration & drip irrigation to soil
  - Includes use of various media, such as sand, gravel, peat, textile, tire chips, etc.
- All treatment systems require professional management!

High groundwater? Raise the infiltration area with a mound

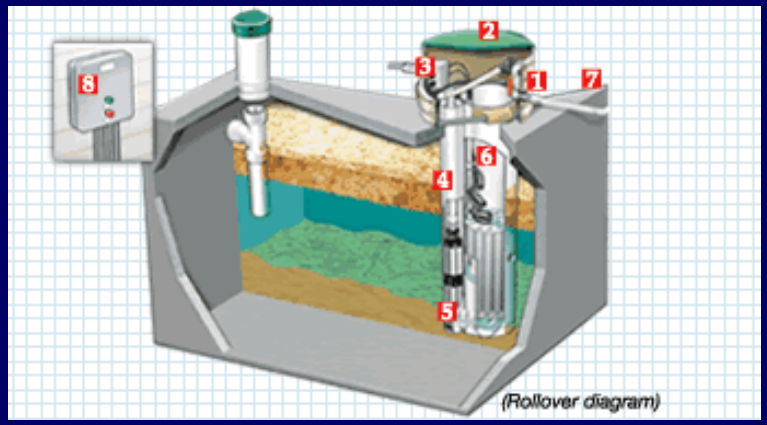


Source: ASAE

Mounds with other types of "media" instead of sand

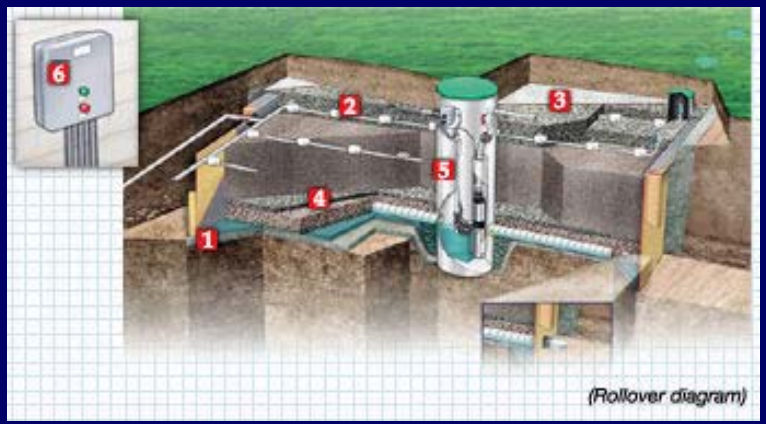


Lots of technology options . . .

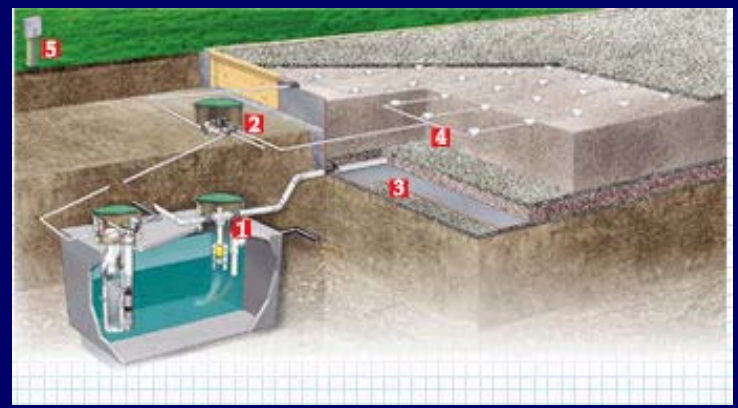


Effluent Pumping

Textile Filter

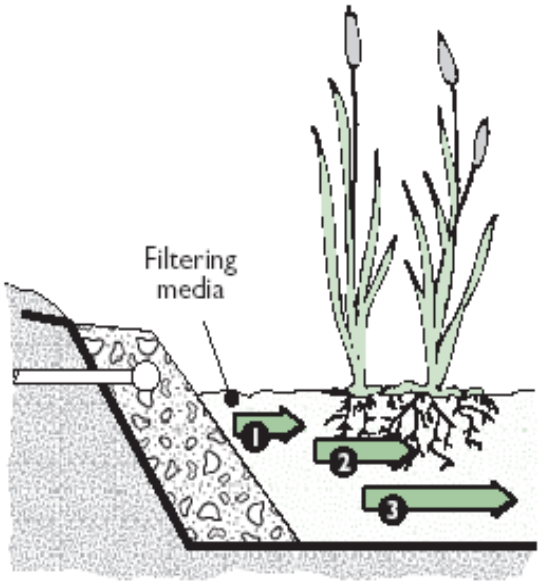


Intermittent Sand Filter



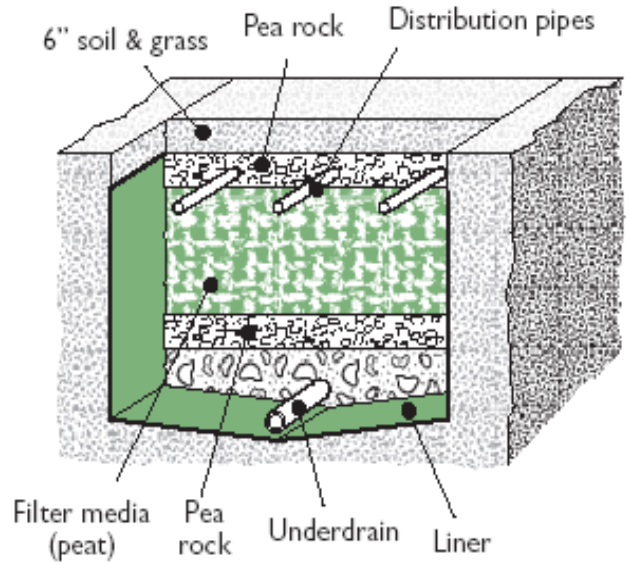
Recirculating Sand Filter

Some other treatment approaches

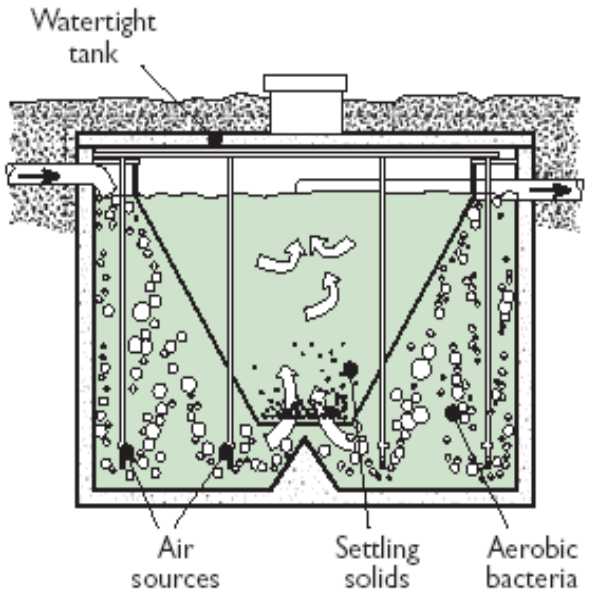


1. Physical filtering
2. Aerobic breakdown at plant roots
3. Anaerobic breakdown in media

Constructed wetland



Peat filter



Aerobic treatment unit (suspended growth type)

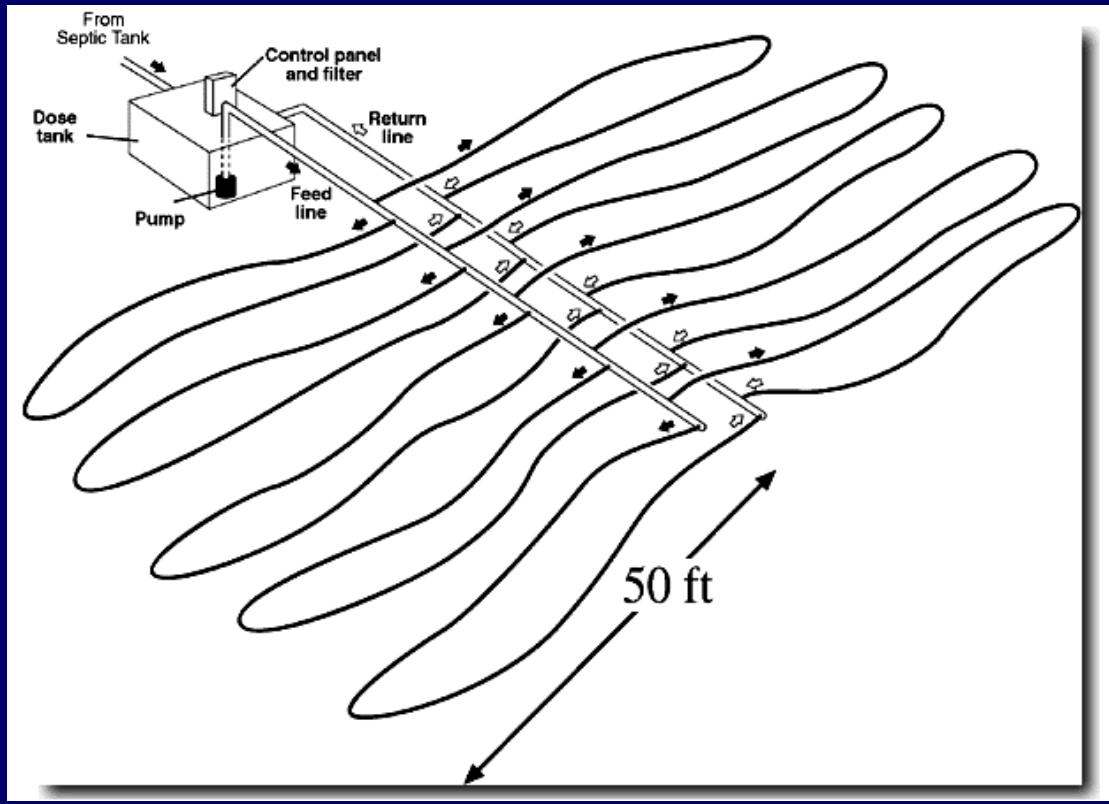

Ditch Witch

Treatment system effectiveness

Pollutant Parameter	Septic Tank Effluent	Aerobic Treatment Unit	Sand Filter Treatment	Foam or Textile Unit	Removal Rate: 3-5' Soil
BOD (mg/l)	140-200	5-50	2-15	5-15	>90%
TN (mg/l)	40-100	25-60	10-50	30-60	10-20%
TP (mg/l)	5-15	4-10	<1-10	5-15	0-100%
Bacteria	10^6-10^8	10^3-10^4	10^1-10^3	10^1-10^3	>99.99%

Drip irrigation: new technology from the agricultural sector

- Drip lines high in the soil profile enhance treatment
- Good for sites with high water tables
- Can be used on sloping sites with trees, etc.



Source: University of Minnesota Extension

Drip Irrigation

- **Disperses treated water (soil used only to polish)**
- **Spreads flow out over entire lateral field (pressure distribution)**
- **Spreads flow out over time (time dosed)**

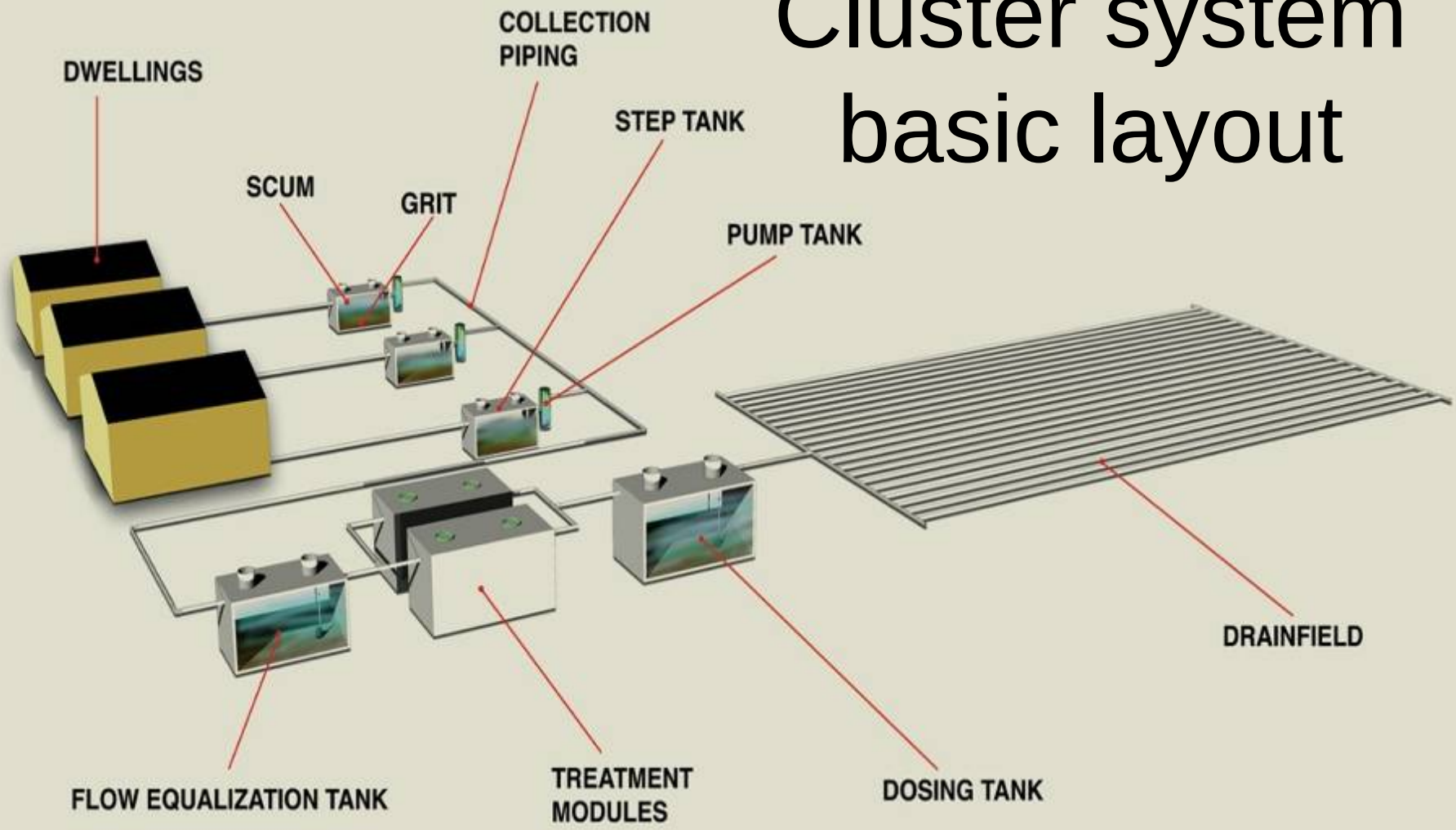
Installing drip irrigation tubing for effluent dispersal into the soil

Clustered treatment systems

- Existing development
  - Can serve dense areas with small lots
  - Improves treatment levels considerably
  - Increases groundwater recharge

- New development
  - Advanced treatment for sites with poor soils, steep slopes, high groundwater
  - Very friendly to smart growth & low-impact development
  - Promotes clustering of homes & businesses, preservation of woodlands & open space

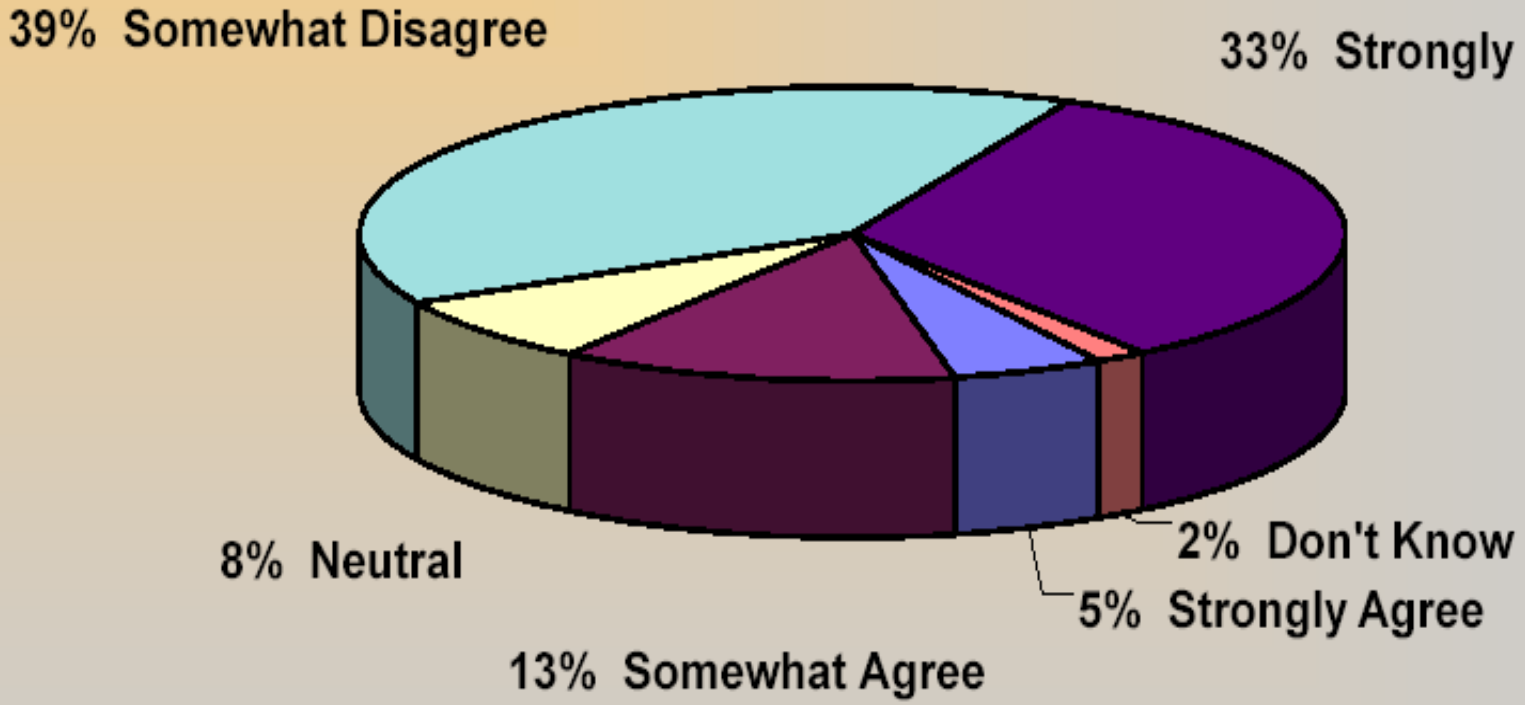
Cluster system basic layout



Managing onsite/clustered systems

- Management for existing systems
  - Assess surface & groundwater quality
  - Assess treatment systems & related risks
  - Find & fix problems
- New system mgmt
  - Planning & design
  - Construction
  - O&M
- System inventories are needed!

Most Homeowners with Septic Systems are Knowledgeable about Septic System Operation and Maintenance



General management approach

- Management intensity is tied to risk
  - Sensitivity of receiving water, local setting
  - Complexity & density of treatment systems
- Public/private mgmt entity is necessary!
  - Example: sanitation district
  - Maintenance contracts
  - Operating permits
  - 3rd party operation/ownership
- Public agencies provide regulatory oversight

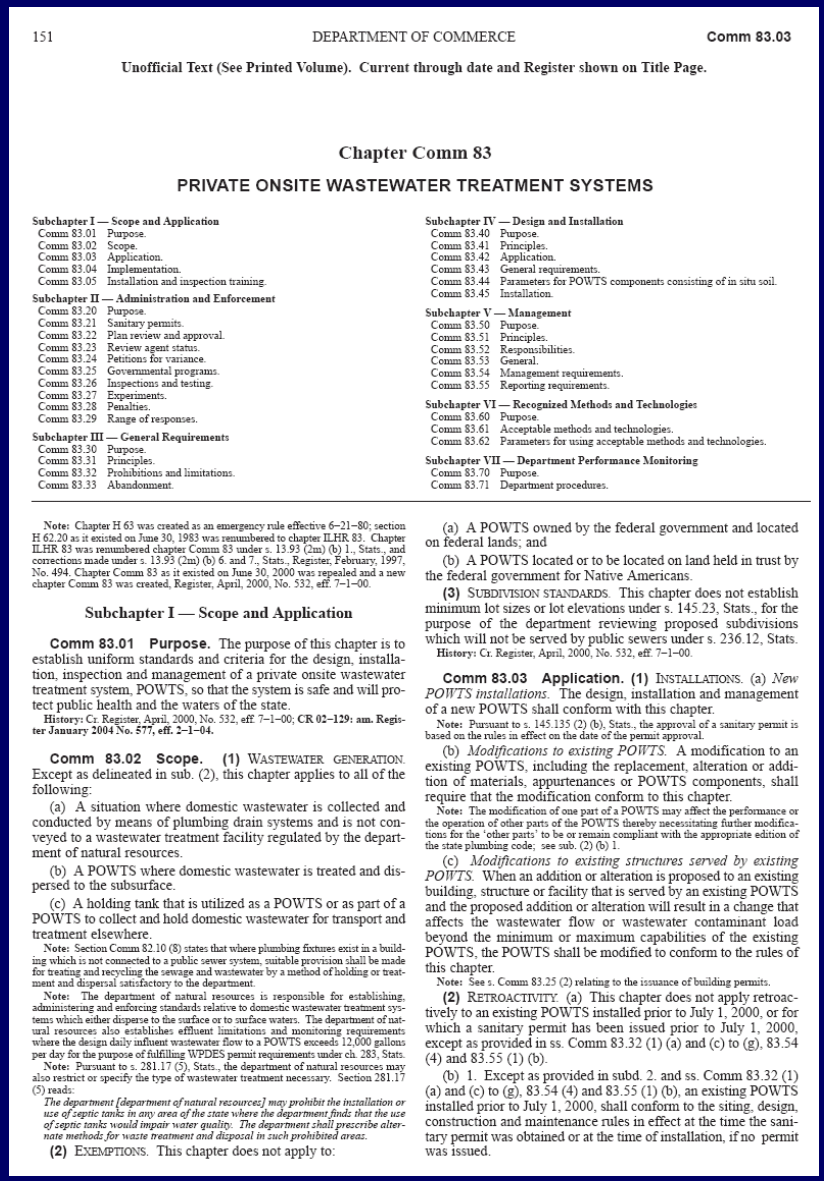
Risk category	Risk factors
Environmental sensitivity	◆ Impermeable soils such as heavy clay ◆ Shallow depths to groundwater ◆ Rock layers near the surface ◆ Hilly terrain with thin soils and steep slopes ◆ High densities of system installations ◆ Sensitive waterbodies nearby
Public health	◆ Drinking water wells nearby ◆ Recreational waters nearby ◆ Effluent surfacing or plumbing backups ◆ Potential for rapid groundwater movement ◆ Systems more than 25 years old not maintained ◆ Illegal system discharges
Treatment complexity	◆ Electrical and mechanical system components ◆ Heavy sewage loads (high-strength wastewaters) ◆ High fat, oil, and grease content in wastewater ◆ Industrial and certain commercial wastewaters

Key entities in system management

- Local health departments
  - issue permits for small systems
  - investigate complaints
  - respond to public health threats
- Tribal environmental agencies
  - ensure system operation
  - investigate complaints
  - ensure compliance
  - monitor water quality

Performance vs. prescriptive codes

- Prescriptive codes
  - Include mandatory setbacks, standard system designs
  - Infiltration area sizing varies according to site conditions
- Performance codes
  - Establish effluent quality requirements
  - Allow design flexibility in meeting requirements



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PRIVATE ONSITE WASTEWATER TREATMENT SYSTEMS

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Comm 83.52 Responsibilities.
Comm 83.53 General.
Comm 83.54 Management requirements.
Comm 83.55 Reporting requirements.

Subchapter VI — Recognized Methods and Technologies
Comm 83.60 Purpose.
Comm 83.61 Acceptable methods and technologies.
Comm 83.62 Parameters for using acceptable methods and technologies.

Subchapter VII — Department Performance Monitoring
Comm 83.70 Purpose.
Comm 83.71 Department procedures.

Note: Chapter H 63 was created as an emergency rule effective 6–21–80; section H 62.20 as it existed on June 30, 1983 was renumbered to chapter ILHR 83. Chapter ILHR 83 was renumbered chapter Comm 83 under s. 13.93 (2m) (b) 1., Stats., and corrections made under s. 13.93 (2m) (b) 6. and 7., Stats., Register, February, 1997, No. 494. Chapter Comm 83 as it existed on June 30, 2000 was repealed and a new chapter Comm 83 was created, Register, April, 2000, No. 532, eff. 7–1–00.

Subchapter I — Scope and Application

Comm 83.01 Purpose. The purpose of this chapter is to establish uniform standards and criteria for the design, installation, inspection and management of a private onsite wastewater treatment system, POWTS, so that the system is safe and will protect public health and the waters of the state.

History: Cr. Register, April, 2000, No. 532, eff. 7–1–00; **CR 02–129: am. Register January 2004 No. 577, eff. 2–1–04.**

Comm 83.02 Scope. (1) WASTEWATER GENERATION. Except as delineated in sub. (2), this chapter applies to all of the following:

(a) A situation where domestic wastewater is collected and conducted by means of plumbing drain systems and is not conveyed to a wastewater treatment facility regulated by the department of natural resources.

(b) A POWTS where domestic wastewater is treated and dispersed to the subsurface.

(c) A holding tank that is utilized as a POWTS or as part of a POWTS to collect and hold domestic wastewater for transport and treatment elsewhere.

Note: Section Comm 82.10 (8) states that where plumbing fixtures exist in a building which is not connected to a public sewer system, suitable provision shall be made for treating and recycling the sewage and wastewater by a method of holding or treatment and dispersal satisfactory to the department.

Note: The department of natural resources is responsible for establishing, administering and enforcing standards relative to domestic wastewater treatment systems which either disperse to the surface or to surface waters. The department of natural resources also establishes effluent limitations and monitoring requirements where the design daily influent wastewater flow to a POWTS exceeds 12,000 gallons per day for the purpose of fulfilling WPDES permit requirements under ch. 283, Stats.

Note: Pursuant to s. 281.17 (5), Stats., the department of natural resources may also restrict or specify the type of wastewater treatment necessary. Section 281.17 (5) reads:

The department [department of natural resources] may prohibit the installation or use of septic tanks in any area of the state where the department finds that the use of septic tanks would impair water quality. The department shall prescribe alternate methods for waste treatment and disposal in such prohibited areas.

(2) EXEMPTIONS. This chapter does not apply to:

(a) A POWTS owned by the federal government and located on federal lands; and

(b) A POWTS located or to be located on land held in trust by the federal government for Native Americans.

(3) SUBDIVISION STANDARDS. This chapter does not establish minimum lot sizes or lot elevations under s. 145.23, Stats., for the purpose of the department reviewing proposed subdivisions which will not be served by public sewers under s. 236.12, Stats.

History: Cr. Register, April, 2000, No. 532, eff. 7–1–00.

Comm 83.03 Application. (1) INSTALLATIONS. (a) *New POWTS installations.* The design, installation and management of a new POWTS shall conform with this chapter.

Note: Pursuant to s. 145.135 (2) (b), Stats., the approval of a sanitary permit is based on the rules in effect on the date of the permit approval.

(b) *Modifications to existing POWTS.* A modification to an existing POWTS, including the replacement, alteration or addition of materials, appurtenances or POWTS components, shall require that the modification conform to this chapter.

Note: The modification of one part of a POWTS may affect the performance or the operation of other parts of the POWTS thereby necessitating further modifications for the 'other parts' to be or remain compliant with the appropriate edition of the state plumbing code; see sub. (2) (b) 1.

(c) *Modifications to existing structures served by existing POWTS.* When an addition or alteration is proposed to an existing building, structure or facility that is served by an existing POWTS and the proposed addition or alteration will result in a change that affects the wastewater flow or wastewater contaminant load beyond the minimum or maximum capabilities of the existing POWTS, the POWTS shall be modified to conform to the rules of this chapter.

Note: See s. Comm 83.25 (2) relating to the issuance of building permits.

(2) RETROACTIVITY. (a) This chapter does not apply retroactively to an existing POWTS installed prior to July 1, 2000, or for which a sanitary permit has been issued prior to July 1, 2000, except as provided in ss. Comm 83.32 (1) (a) and (c) to (g), 83.54 (4) and 83.55 (1) (b).

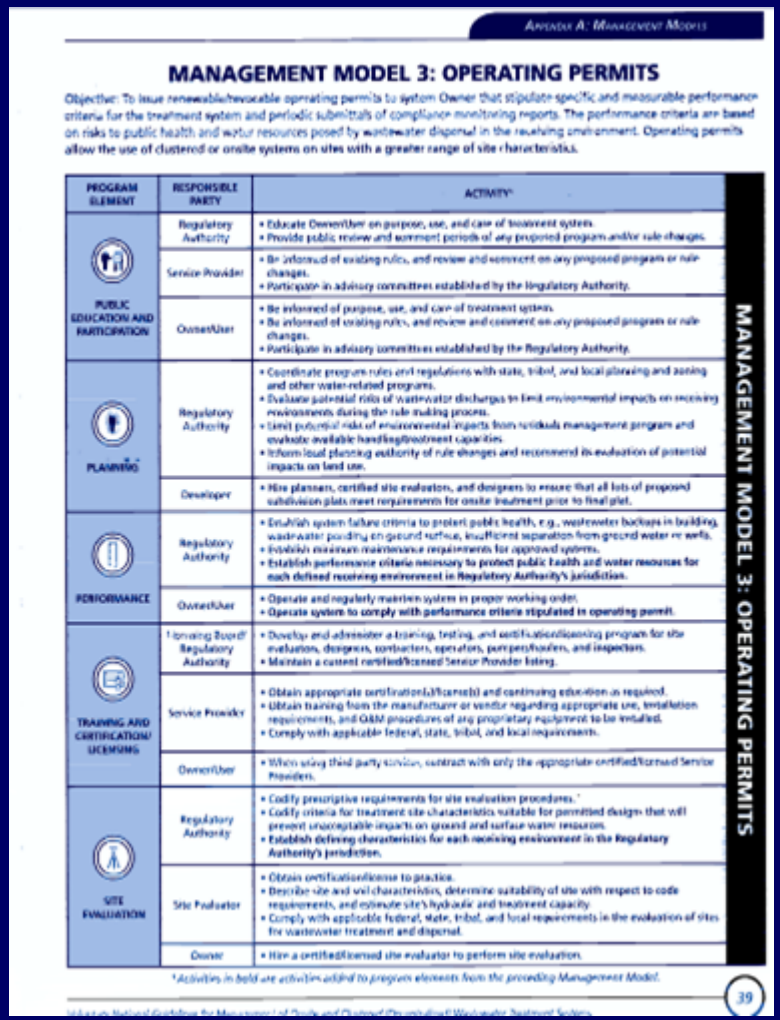
(b) 1. Except as provided in subd. 2. and ss. Comm 83.32 (1) (a) and (c) to (g), 83.54 (4) and 83.55 (1) (b), an existing POWTS installed prior to July 1, 2000, shall conform to the siting, design, construction and maintenance rules in effect at the time the sanitary permit was obtained or at the time of installation, if no permit was issued.

US EPA resources at www.epa/gov/owm/septic

- Design guidance
- Management guidelines
- Case studies
- Technology fact sheets
- State and local examples
- Research, demonstration projects, and other tools

Elements of a Comprehensive Management Program

- Public Involvement
- Planning
- Performance Requirements
- Training & Certification/ Licensing
- Site Evaluation
- Design
- Construction



APPENDIX A: MANAGEMENT MODELS

MANAGEMENT MODEL 3: OPERATING PERMITS

Objective: To issue renewable/revocable operating permits to system Owner that stipulate specific and measurable performance criteria for the treatment system and periodic submittals of compliance monitoring reports. The performance criteria are based on risks to public health and water resources posed by wastewater disposal in the receiving environment. Operating permits allow the use of clustered or onsite systems on sites with a greater range of site characteristics.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY*
PUBLIC EDUCATION AND PARTICIPATION	Regulatory Authority	• Educate Owner/User on purpose, use, and care of treatment system. • Provide public review and comment periods of any proposed program and/or rule changes.
	Service Provider	• Be informed of existing rules, and review and comment on any proposed program or rule changes. • Participate in advisory committees established by the Regulatory Authority.
	Owner/User	• Be informed of purpose, use, and care of treatment system. • Be informed of existing rules, and review and comment on any proposed program or rule changes. • Participate in advisory committees established by the Regulatory Authority.
PLANNING	Regulatory Authority	• Coordinate program rules and regulations with state, tribal, and local planning and zoning and other water-related programs. • Evaluate potential risks of wastewater discharges to limit environmental impacts on receiving environments during the rule making process. • Limit potential risks of environmental impacts from residuals management program and evaluate available handling/treatment capacities. • Inform local planning authority of rule changes and recommend its evaluation of potential impacts on land use.
	Developer	• Hire planners, certified site evaluators, and designers to ensure that all lots of proposed subdivision plats meet requirements for onsite treatment prior to final plat.
PERFORMANCE	Regulatory Authority	• Establish system failure criteria to protect public health, e.g., wastewater backups in building, wastewater ponding on ground surface, insufficient separation from ground water or wells. • Establish minimum maintenance requirements for approved systems. • Establish performance criteria necessary to protect public health and water resources for each defined receiving environment in Regulatory Authority's jurisdiction.
	Owner/User	• Operate and regularly maintain system in proper working order. • Operate system to comply with performance criteria stipulated in operating permit.
TRAINING AND CERTIFICATION/ LICENSING	Licensing Board/ Regulatory Authority	• Develop and administer a training, testing, and certification/licensing program for site evaluators, designers, contractors, operators, pumpers/haulers, and inspectors. • Maintain a current certified/licensed Service Provider listing.
	Service Provider	• Obtain appropriate certification(s)/license(s) and continuing education as required. • Obtain training from the manufacturer or vendor regarding appropriate use, installation requirements, and O&M procedures of any proprietary equipment to be installed. • Comply with applicable federal, state, tribal, and local requirements.
	Owner/User	• When using third party services, contract with only the appropriate certified/licensed Service Providers.
SITE EVALUATION	Regulatory Authority	• Codify prescriptive requirements for site evaluation procedures. • Codify criteria for treatment site characteristics suitable for permitted designs that will prevent unacceptable impacts on ground and surface water resources. • Establish defining characteristics for each receiving environment in the Regulatory Authority's jurisdiction.
	Site Evaluator	• Obtain certification/license to practice. • Describe site and soil characteristics, determine suitability of site with respect to code requirements, and estimate site's hydraulic and treatment capacity. • Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.
	Owner	• Hire a certified/licensed site evaluator to perform site evaluation.

*Activities in bold are activities added to program elements from the preceding Management Model.

MANAGEMENT MODEL 3: OPERATING PERMITS

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- O&M
- Residuals Management
- Inspections/ Monitoring
- Corrective Actions
- Record-Keeping/ Reporting
- Financing

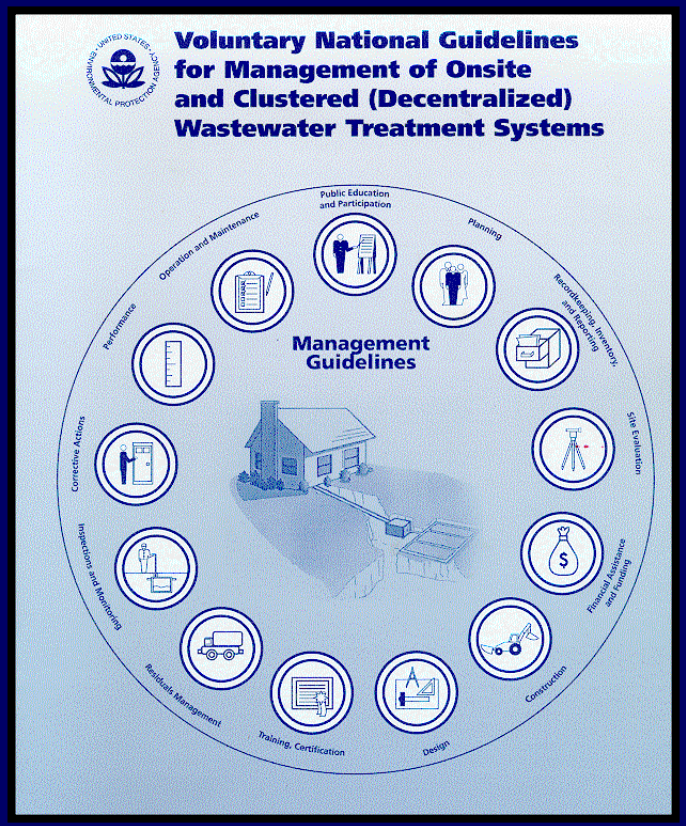
Elements	Purpose	Basic activities	Advanced activities
Administration			
Performance requirements	Link treatment standards and relative risk to health and water resource goals.	Prescribe acceptable site characteristics and system types allowed.	Stipulate that system performance must meet defined standards that consider water resource values, vulnerabilities and risks.
Planning	Consider site and regional conditions and effects on long-term watershed and public health.	Identify minimum lot sizes, surface water/groundwater separation distances, and critical areas requiring protection.	Monitor and model regional pollutant loads; tailor development patterns based on environmental and physical limitations; require clustering for large developments.
Record-keeping, inventory and reporting	Create inventory of systems and O&M logs, planning and reporting to oversight agencies.	Provide inventory information on all systems; submit performance reports to health agency.	Provide GIS-based comprehensive inventories, including web-based monitoring and O&M data input for administrative reporting and watershed assessment studies.
Financial assistance and funding	Provide financial and legal support for management program.	Implement basic powers, revenue-generation fees, and legal backup for a sustainable program.	Initiate monthly or quarterly service fees; cost-share or other repair/replacement program; full financial and legal support for management program; equitable revenue base and assistance programs; regular reviews and modifications.
Public education and participation	Maximize public involvement while developing a management program.	Sponsor public meetings, forums, updates and education programs.	Maintain public advisory groups, review groups, and other involvement opportunities in the program; distribute educational and other materials.

Elements	Purpose	Basic activities	Advanced activities
Installation			
Site evaluation	Assess system site and relationship to other features (groundwater and surface water).	Characterize landscape, soils, ground and surface water location, lot size, and other conditions.	Assess site and cumulative watershed impacts, groundwater mounding potential, long-term specific pollutant trends, and cluster system needs.
System design	Ensure that system is appropriate for site, watershed and wastewater characteristics.	Prescribe a limited number of acceptable designs for specific site conditions.	Implement codes for developing designs that meet performance requirements for each site; address wastewater, reuse and dispersal options.
Construction	Ensure installation as designed; record as-built drawings.	Inspect installation prior to covering with soil and enter as-built information into the file record.	Provide supplemental training, certification and licensing programs; provide more comprehensive inspection of installations; verify and enter as-built information into the record.

Elements	Purpose	Basic activities	Advanced activities
Operation and Compliance			
Operation and maintenance	Ensure that systems perform as designed.	Initiate homeowner education and reminder programs that promote O&M.	Require service contracts or renewable, revocable operating permits with periodic reporting; log service reports in database; ensure responsibility for O&M activities.
Inspections and monitoring	Document provider performance, functioning of systems, and impacts.	Perform inspection prior to cover-up and property title transfer; provide complaint response.	Conduct regional surface water and groundwater monitoring; web-based inspection reporting and system operational monitoring; require installation and periodic operational inspections.
Residuals management	Remove and treat residuals; minimize health or environmental risks from residuals handling, use, and dispersal.	Ensure compliance with federal and state codes for residuals dispersal.	Conduct analysis and oversight of residuals program; web-based reporting and inspection of pumping and dispersal facility activities; assistance in locating or developing residuals handling facilities.
Training and certification/ licensing	Promote excellence in site evaluation, design, installation, O&M, and other service provider areas.	Recommend use of only state-licensed/certified service providers.	Provide supplemental training and certification/licensing programs; offer continuing education opportunities; monitor performance through inspections; sponsor mentoring programs.
Corrective actions and enforcement	Ensure timely compliance with applicable codes and performance requirements.	Provide for complaint reporting under nuisance laws; inspection and prompt response procedures and penalties.	Deny or revoke operating permit until compliance measures are satisfied; set violation response protocol and legal response actions, including correction and liens against property by RME.

Objectives of the Guidelines

- Facilitate **improved management** of onsite/cluster systems
- **Institutionalize** the management concept at the state and local levels
- Promote **consistent management approaches**
- Establish **benchmarks** for minimum levels of management appropriate for the management goals
- Provide **flexibility to customize and upgrade** the management program
- Include both **surface and ground water discharges**



Management models: highlights

- **Program Model 1: Homeowner Awareness**
  - Prescriptive system designs
  - Proactive maintenance encouraged through education and reminders
- **Program Model 2: Maintenance Contracts**
  - Enhanced treatment on traditional sites
  - Required maintenance contracts between owner and operator
- **Program Model 3: Operating Permits**
  - Entry to performance-based programs (operating permits)
  - Compliance based on performance rather than technology or design
- **Program Models 4 & 5: RME O&M or Ownership**
  - Responsibilities given to responsible management entity (4-third party O&M; 5-third party ownership)
  - Watershed-wide planning

How Can the Management Guidelines be Used?

- To evaluate and improve existing programs
- To determine appropriate management structures that will provide the necessary powers for effective implementation
- To develop codes and ordinances
- To learn about a variety of programs already implemented in other areas of the country
- To explore tools that can be helpful in providing services and their administration

EPA Management Handbook

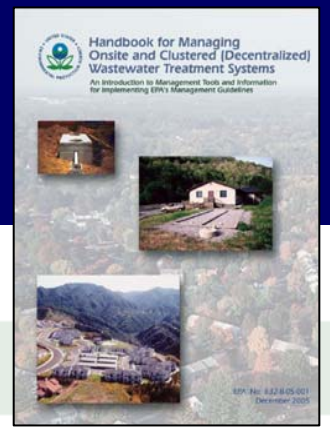


Figure 1. *Process for developing a decentralized wastewater management program*

STEPS	KEY ACTIVITIES
1 Conduct initial scoping and outreach.	*Chapter 1* ■ Conduct informal surveys of existing system performance. ■ Review potential problems. ■ Identify organizations involved in system planning, permitting, operation, and maintenance. ■ Conduct initial outreach and education and convene interested parties to define problems and how to address them.
2 Convene interested stakeholders to investigate system performance and set goals.	*Chapter 2* ■ Identify key stakeholders (community leaders, regulators) and other potential partners (planning departments, developers, service providers, existing management entities, and watershed groups). ■ Develop a formal or informal group of key stakeholders to evaluate current activities, assess existing information, define problems, determine the feasibility of establishing or enhancing a management program, and develop goals.

3

Analyze existing information to assess the community and evaluate current and future risks.

Chapter 3

- Develop a community profile to assess socioeconomic and other community factors.
- Review existing statutory and regulatory authority.
- Determine the current management approach of the existing regulatory authorities.
- Inventory or otherwise collect information on existing systems and impacts, analyze risks posed by existing systems, and assign potential of risk to systems and groups of systems.
- Assess growth and development trends and create risk scenarios under various management approaches to determine wastewater planning and management needs for newly served areas.

4

Enhance existing management program or develop new management entities.

Chapter 4

- Synthesize information to identify and prioritize risks and management gaps.
- Select program management approach.
- Partner with stakeholder organizations (planning/zoning, water resource, service providers, and other entities) to determine implementation feasibility.
- Conduct a reality check to determine the availability of management, technical, financial, and other resources.

5

Implement selected elements of the management program, monitor and adapt as necessary.

Chapter 5

- Investigate resources needed to implement the program.
- Establish management requirements for existing and new treatment systems based on health and water resource risks.
- Evaluate approaches and powers needed for implementing management programs.
- Coordinate with other wastewater and water programs.
- Solicit support and resources from stakeholders.
- Develop indicators to determine progress.
- Implement and adapt management program as necessary.

The Good

- Onsite & decentralized systems are not a big problem in most places
  - Agriculture, “big pipe” treatment systems, construction/development, urban runoff, & etc. are more significant
  - Notable exceptions exist, with high public attention & interest in solutions
- Decentralized wastewater treatment technologies are dependable & performing well, for the most part
  - Greater acceptance of new technologies in more places
- New focus on perpetual management can address poor public perceptions and improve acceptance
  - Management is also creating new business opportunities
- Combined sewer overflow and sanitary sewer overflow problems increase interest in decentralized approaches

The Bad

- Approvals for new technologies still difficult in some jurisdictions
- Wastewater codes being used as de facto zoning in many locales
- System selection/design driven by site – rather than watershed – considerations
- Integration of wastewater and stormwater planning is moving very slowly
- More technical expertise is needed in local regulatory and planning agencies

The problems with a piecemeal approach to water resource mgmt.

- Polluted runoff is the biggest problem
- Wastewater and stormwater are integrated
- Both are tied to development patterns
- Both could benefit from better planning

The problems with large-lot zoning

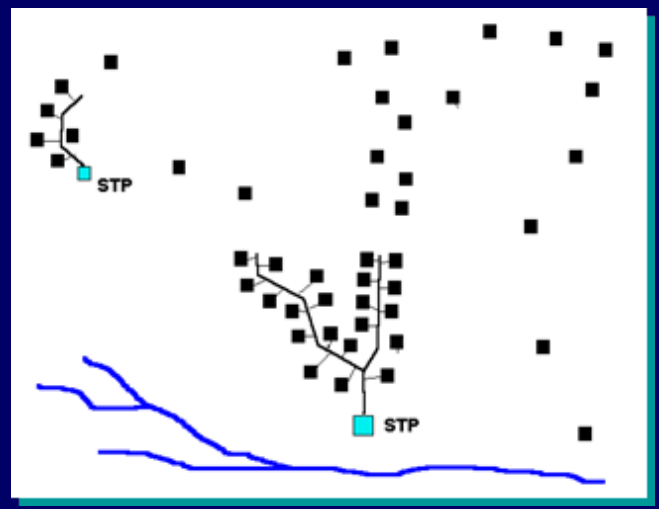
- Goal is to spread out & thereby reduce wastewater nitrate & phosphorus impacts
- But property owners turn into “yard farmers”
- Stream vegetation, woodlands, natural areas disappear
- Sprawl is the result

Conserving natural areas

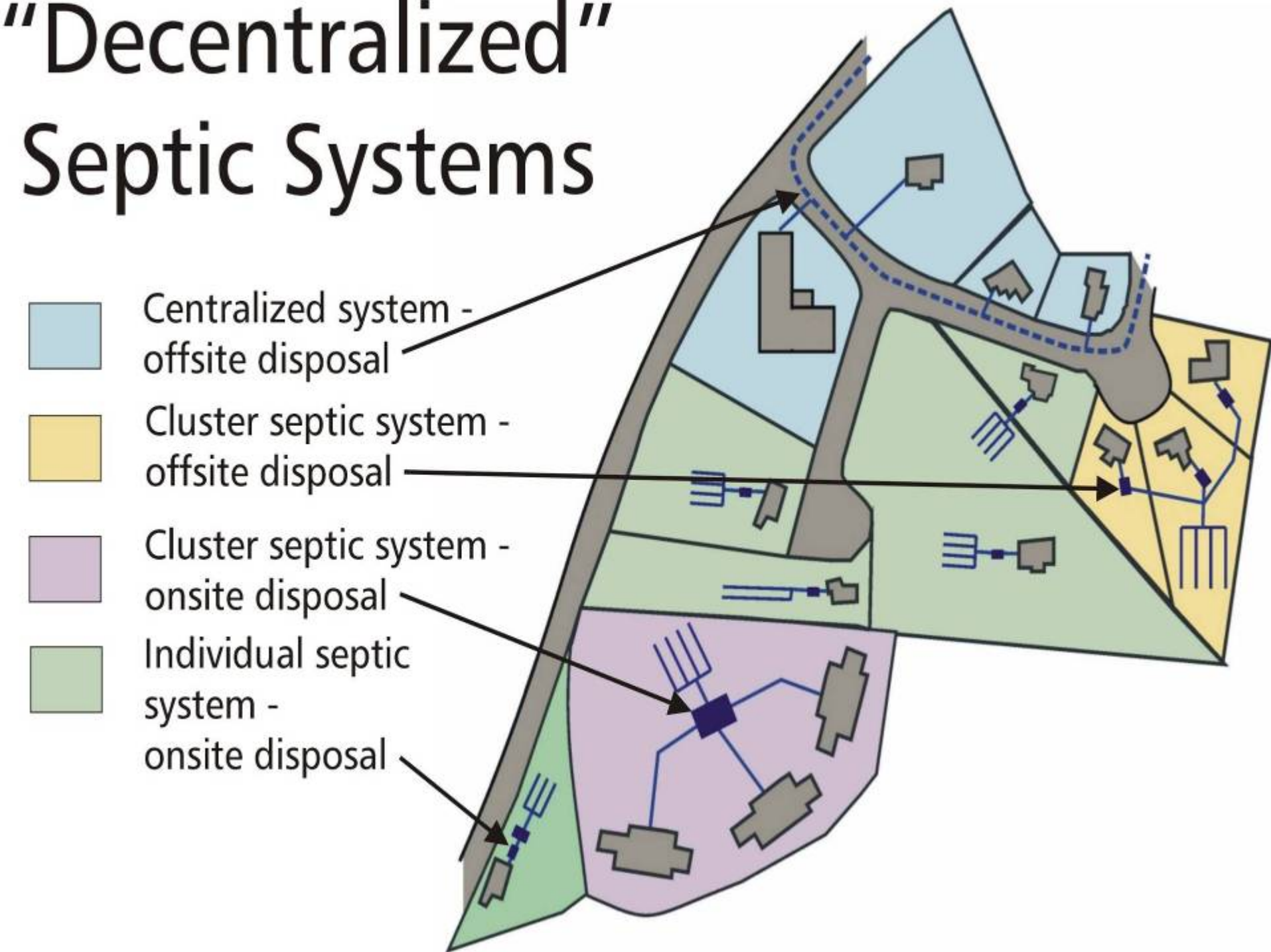
- Conservation of drainages, trees & vegetation
- Land use planning
- Watershed planning
- Habitat conservation plans
- Stream & wetland buffers

Advantages of decentralized (distributed) treatment

- Extent of sewers limited
- Multiple, small discharges for enhanced assimilation
- Conserves water within watershed through groundwater recharge
- Avoids large mass loadings at outfalls
- Risks from malfunctions small and easier to manage
- Can match implementation with capacity needs



"Decentralized" Septic Systems

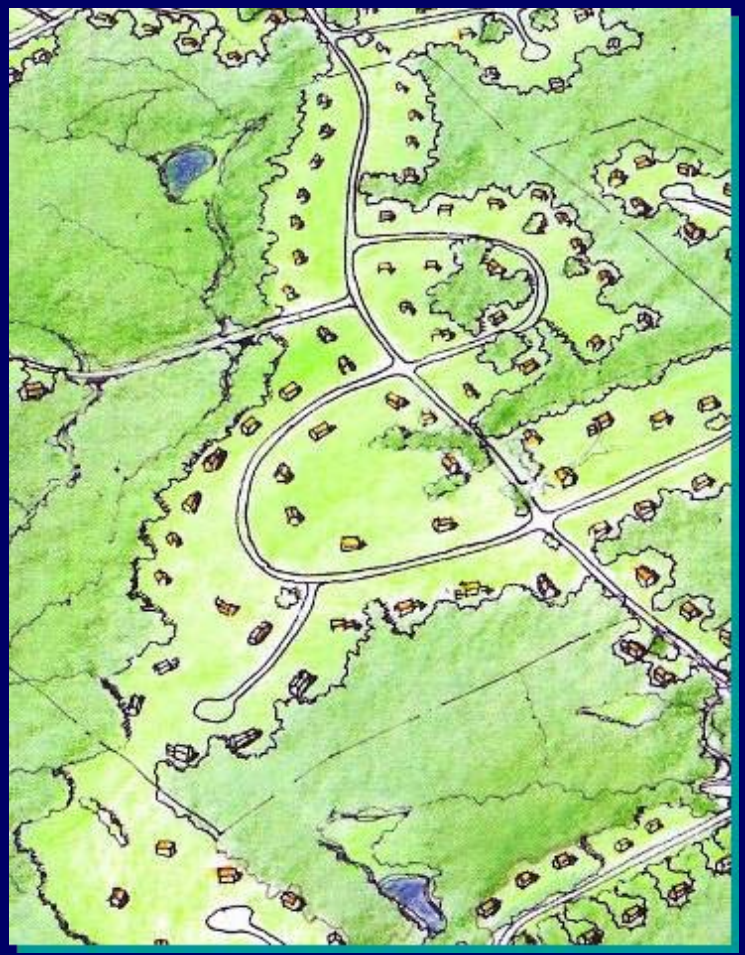


Integrated wastewater/stormwater management & low-impact development

- Conservation of natural drainage system, trees & vegetation
- Clustered wastewater treatment
- Open space / greenways provide for wastewater & stormwater dispersal

Our rules and practices should add value!

This?



Or this?

Illustrations from “A Creative Combination: Merging Alternative Wastewater Treatment with Smart Growth” by Joubert, Loomis, Dow, Gold, Brennan, Jobin, & Flinker, Published by University of Rhode Island, 2005

Rocky Mountain Institute Cost/Benefit Analysis of Centralized and Decentralized Wastewater Options

www.rmi.org

Valuing Decentralized Wastewater Technologies

A Catalog of Benefits, Costs, and Economic Analysis Techniques

Prepared by Rocky Mountain Institute
For the U.S. Environmental Protection Agency
November, 2004

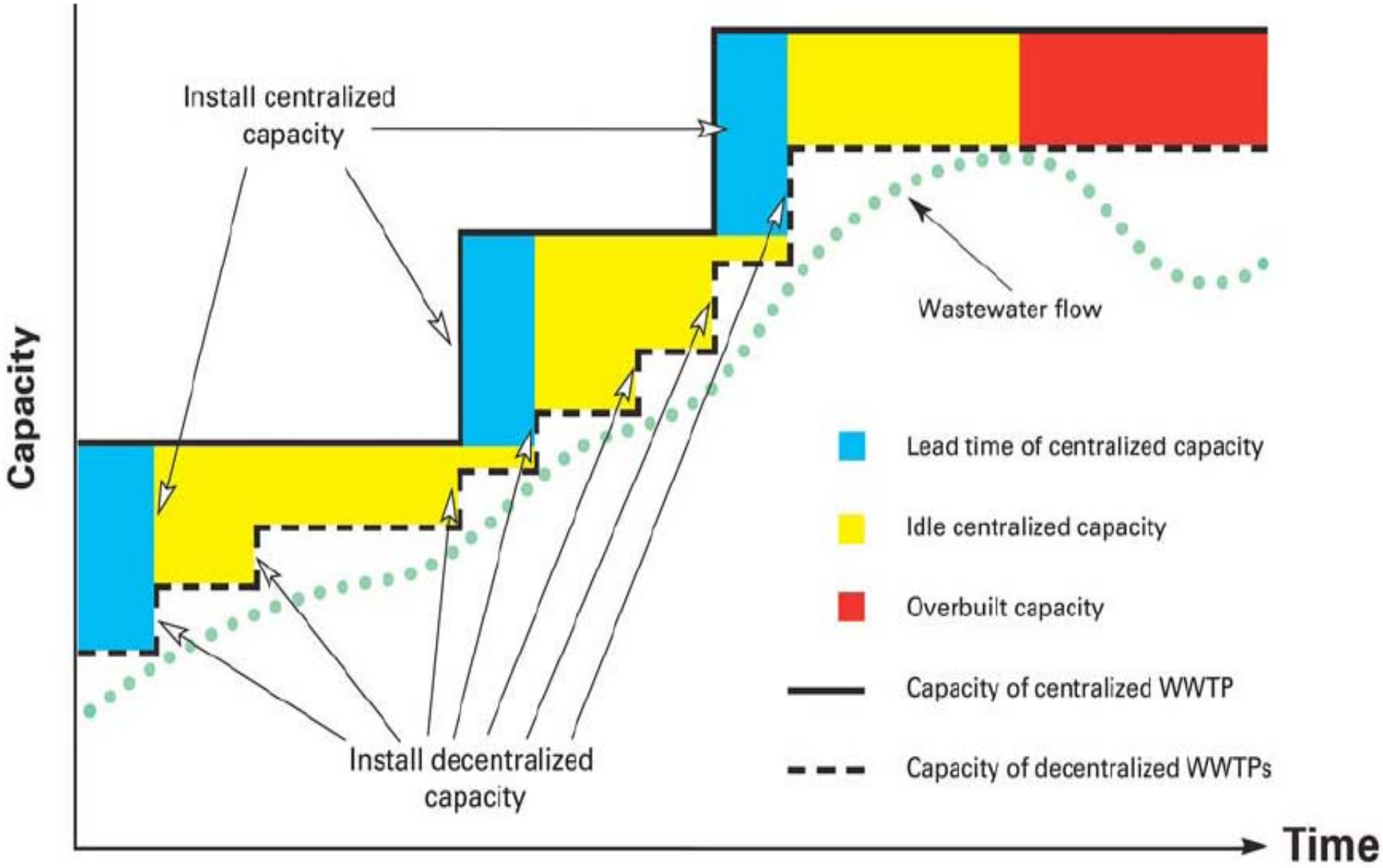


Figure 8-1: Flow Versus Capacity for Centralized and Decentralized Wastewater Systems. WWTP stands for Wastewater Treatment Plant.

Thank You!