

# “How-To” Guide for Wastewater Management of Rural, Underserved Communities in the Black Belt Region of Alabama: A Resource for Local Stakeholders

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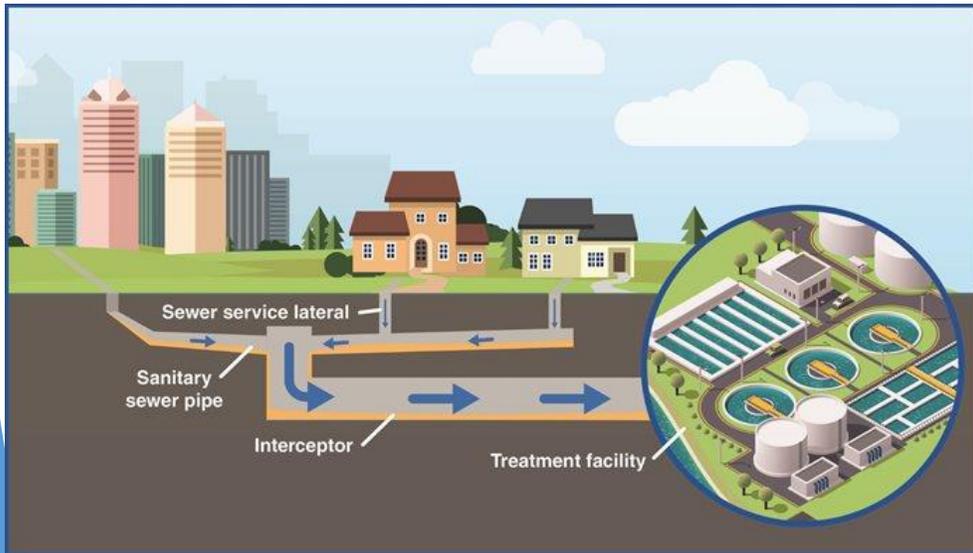
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# Wastewater Management in the U.S.

## Centralized Networked Systems

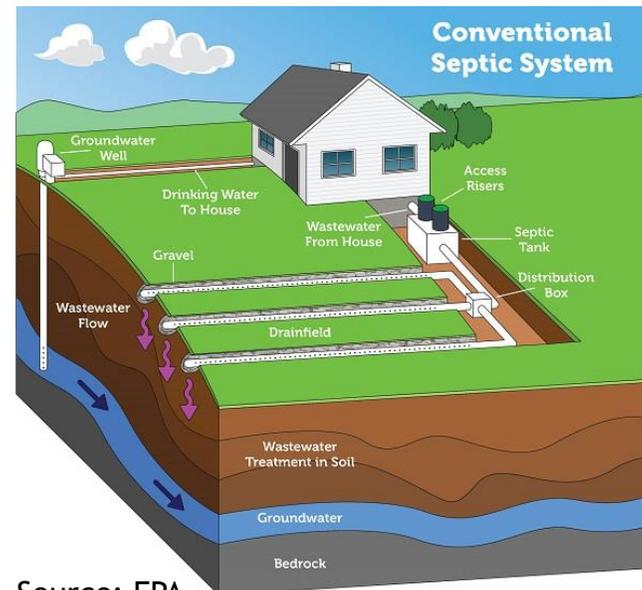
- ▶ Sewer systems common in cities
- ▶ 75% of U.S. population
- ▶ Resident pays monthly bill



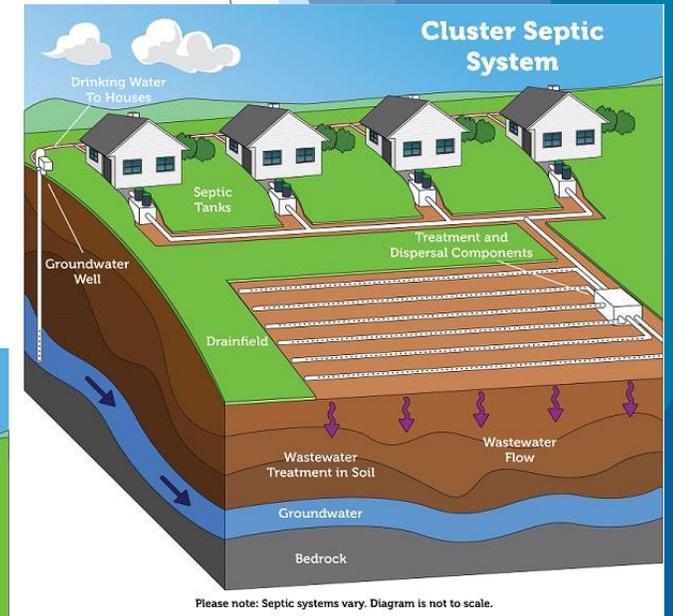
Source: Metropolitan Council

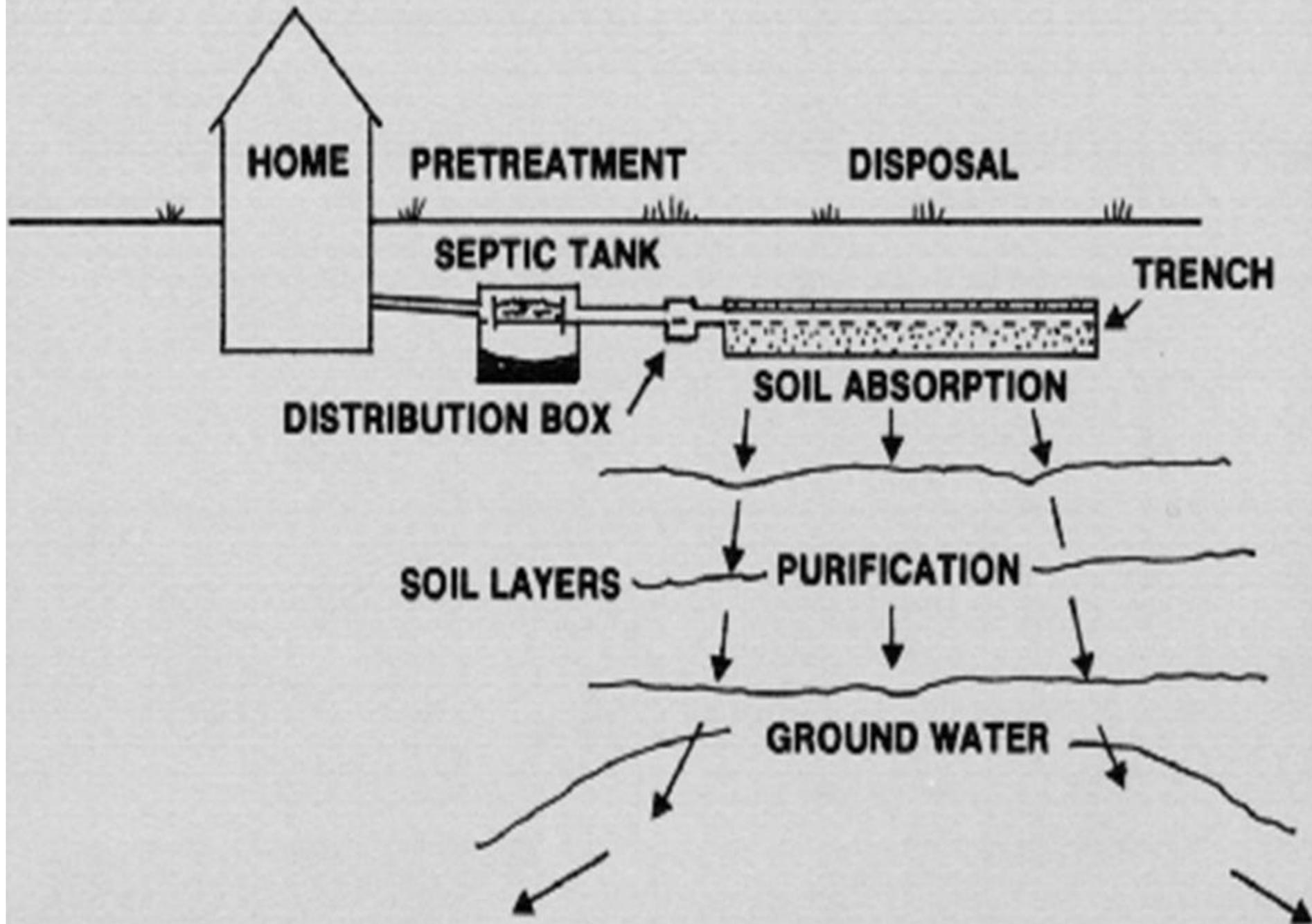
## Onsite and Decentralized Systems (OWTS)

- ▶ 25% of U.S. population
- ▶ 30% of new buildings
- ▶ Resident pays capital and ongoing expenses



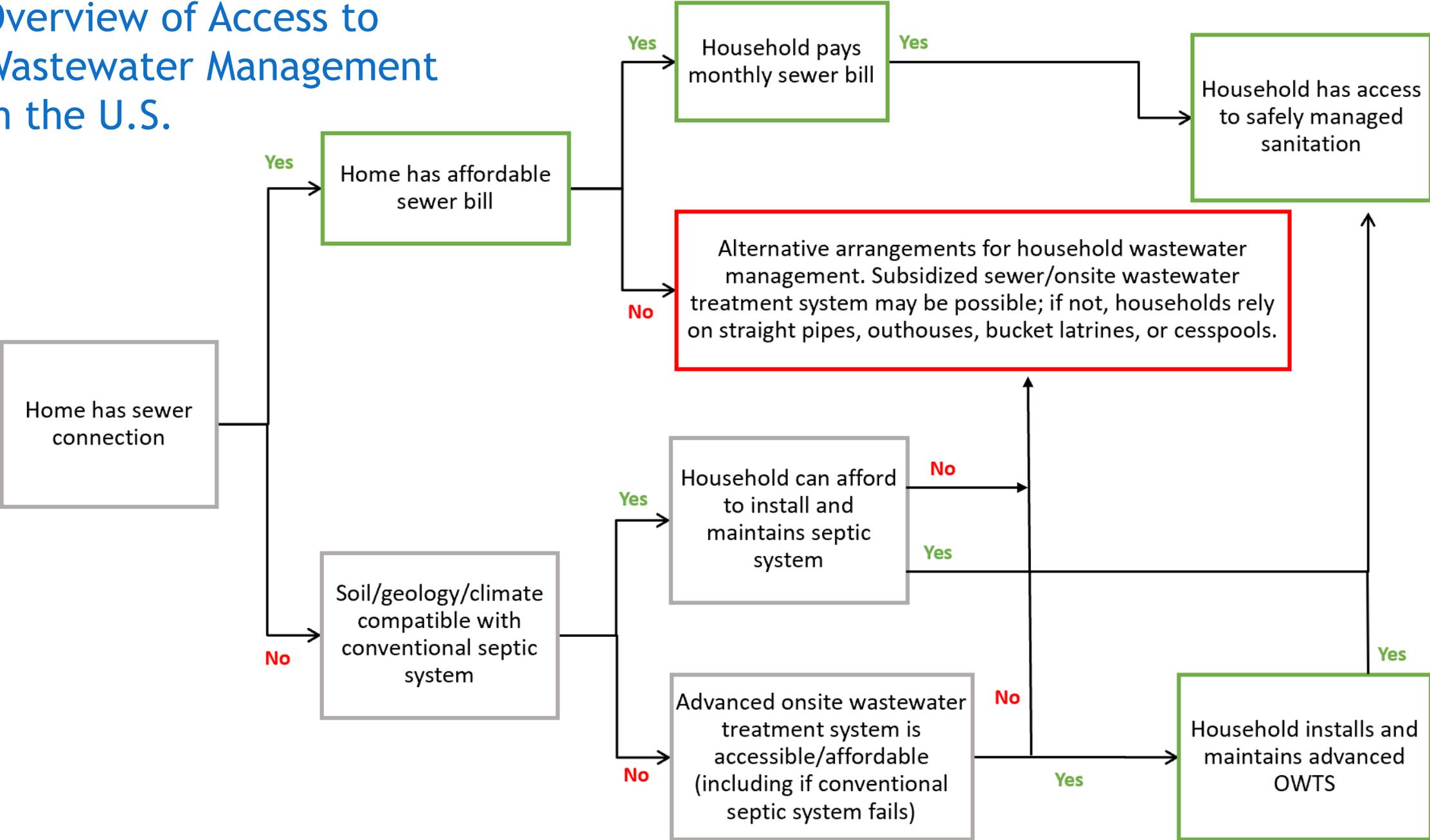
Source: EPA  
Please note: Septic systems vary. Diagram is not to scale.





Source: Purdue Univ. Extension Service (Jones et al., 1990)

# Overview of Access to Wastewater Management in the U.S.

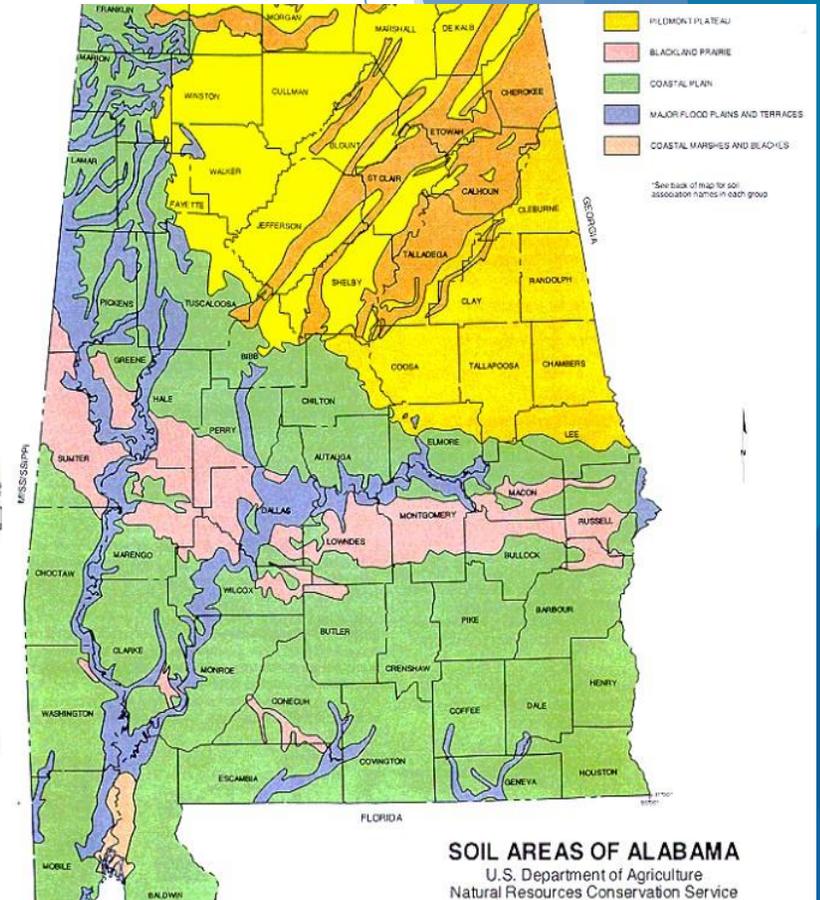


# Black Belt Region of Alabama

- ❖ Approximately 550,000 residents
- ❖ Named for rich, dark topsoil
- ❖ In many places underlain by impermeable shrink/swell clay (vertisol)
- ❖ Shallow impermeable chalk
- ❖ Counties 25-40% poverty
- ❖ Poverty limits alternatives



Source: The University of Alabama Center for Economic Development (UACED)



Source: USDA, NRCS

# What are “Straight Pipes”?

With no sewer access, poverty and unsuitable soil: many have ‘straight pipe’ raw sewage discharge

**Straight pipes:** discharge untreated wastewater from a home to the surface, typically piped into adjacent woods, a trench or a stream

“community line” connects multiple homes to a central large straight pipe



# Alabama Straight Pipe Data

County	Bibb	Wilcox	Hale
Year of Data	2005	2016	2016
Sample Size (homes)	2000	289	411
Permitted Systems		7%	35%
<b>Straight Pipe System</b>	<b>15%</b>	<b>60%</b>	<b>6%</b>
Unpermitted System <i>but no visible Straight Pipe</i>		33%	59%
Septic Tank/Drainfield with Hydraulic Failure	35%		



Source: The University of Alabama Center for Economic Development (UACED)

# Straight Pipe Data in the U.S.

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Water Research  
Volume 190, 15 February 2021, 116647

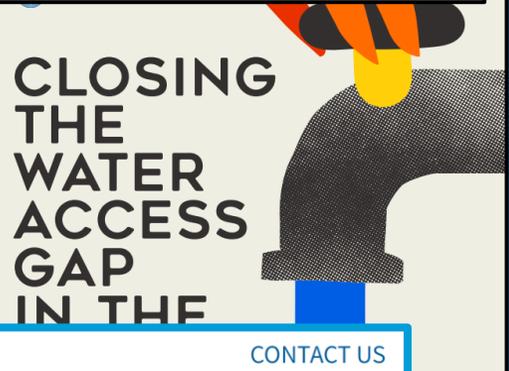


# 'This is unacceptable': EPA chief visits failing sewage systems in Alabama Black Belt

Making Waves  
Making waves in surface discharge from homes  
Jillian Maxcy-Brown<sup>a</sup>,  
Upmanu Lall<sup>e</sup>

## Black Belt sewage woes: Feds give \$4.9M for rural wastewater project

Updated: Mar. 14, 2021, 7:30 a.m. | Published: Mar. 14, 2021, 7:30 a.m.



### Flushed and Forgotten

Sanitation and Wastewater in Rural Communities in the United States



The Alabama Center for Rural Enterprise (ACRE)  
The Columbia Law School Human Rights Clinic  
The Institute for the Study of Human Rights at Columbia University

Environmental Engineering Science, Vol. 28, No. 10 | Full Access

### Assessing the Status of Onsite Wastewater Treatment Area

News Releases: [Headquarters](#)

## EPA Releases New Memo Outlining Strategy to Equitably Deliver Clean Water Through President Biden's Bipartisan Infrastructure Law

March 8, 2022

### THE BLACK BELT'S WASTEWATER CRISIS

Many rural households in America don't have access to safe sewage systems. In Alabama, entrenched poverty and unusual geology have created a public-health disaster.

### Access to Safe Drinking Water and Sanitation Black Belt: A Cross-Sectional Case Study

& [Joe Brown](#)  
& Health 5, 69–74 (2013) | [Cite this article](#)  
Metrics

## Barriers to Addressing Wastewater Issues in Small Communities

- ▶ Infrastructure Investments have decreased
- ▶ Data is limited
- ▶ Information is scattered among numerous resources
- ▶ Resources are not always accessible and understandable

# Resource Outline

1. Executive Summary
2. Importance of Proper Wastewater Management
3. Traditional Municipal Network Systems
4. Onsite Individual Systems
5. Decentralized Cluster Systems
6. Management Options
7. Ordinances and Legal Considerations
8. Funding Sources
9. Community Education and Outreach
10. Contact Information

# Importance of Proper Wastewater Management

- ▶ Contaminant Exposure Pathways
- ▶ Economic Development



# Wastewater Collection Strategies

1. Traditional Municipal Systems
2. Onsite Individual Systems
3. Decentralized Cluster Systems

These sections include:

- ▶ Description of Collection Method
- ▶ Recommendations from Wastewater Needs Studies
- ▶ Life Cycle Cost Estimates

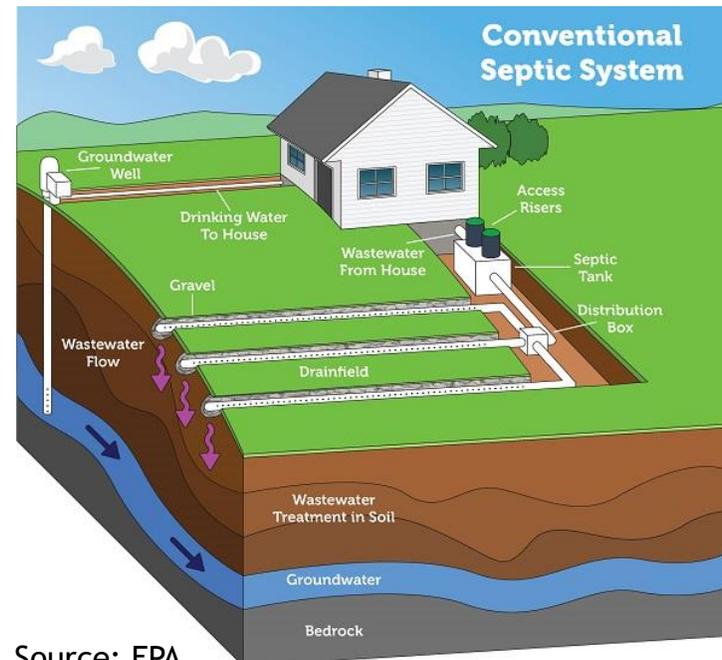
# Traditional Municipal Network Systems

- ▶ 72 Centralized Wastewater Treatment Plants
  - ▶ 76% municipal
  - ▶ 10% K-12 schools
  - ▶ 14% other (state parks, industrial, and private)
- ▶ Some systems can be extended
- ▶ Costly to install (\$1M/mi)
- ▶ Homeowners typically pay connection fee



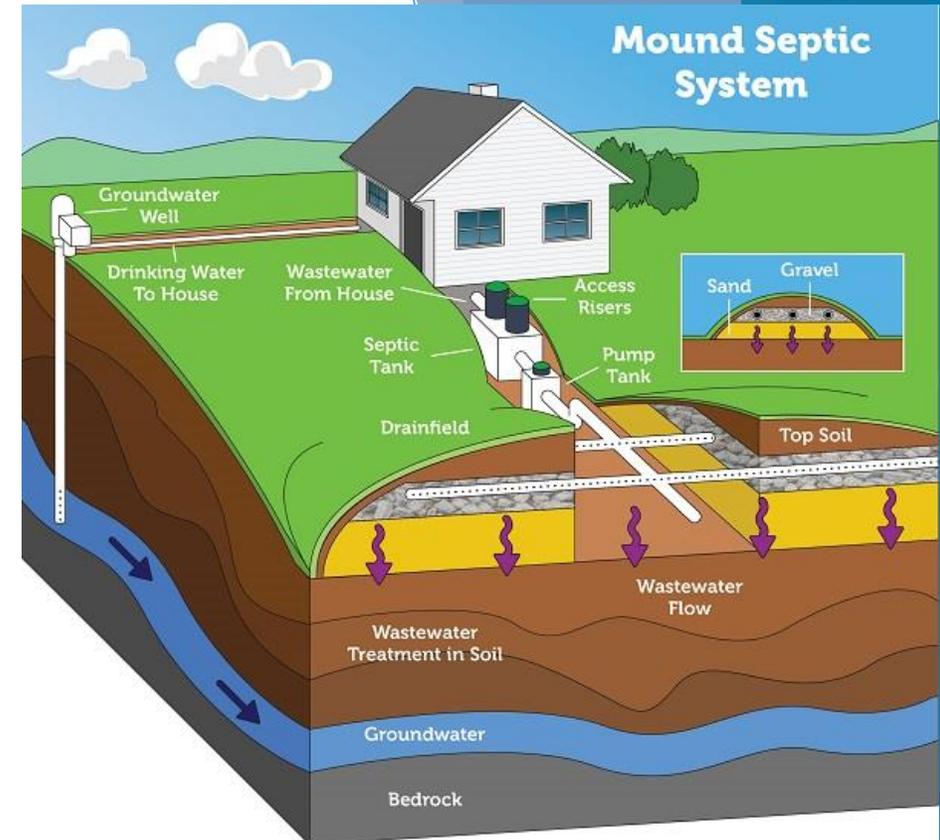
# Onsite Individual Systems

- ▶ Conventional Septic Tank and Drainfield- ~\$3,000
- ▶ Advanced Onsite Systems- \$5,000+



Source: EPA

Please note: Septic systems vary. Diagram is not to scale.

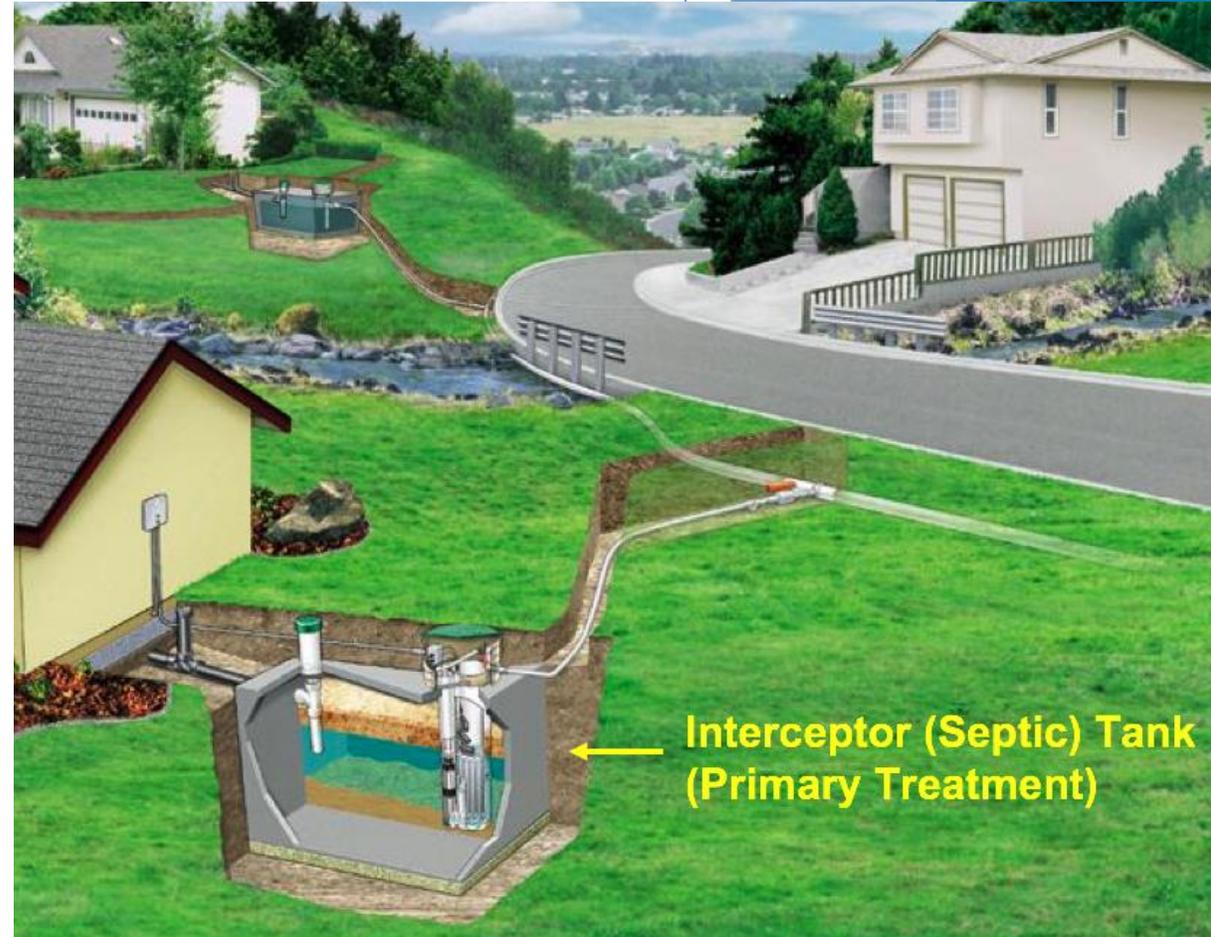


Source: EPA

Please note: Septic systems vary. Diagram is not to scale.

# Decentralized Cluster Systems

- ▶ Connect multiple houses to one treatment system
- ▶ Septic Tank Effluent Pump or Pressure (STEP) or Gravity (STEG)
  - ▶ Liquid Only
- ▶ Costs approx. \$15,000 per connection
- ▶ Discharges into
  - ▶ nearby sewer system
  - ▶ water body
  - ▶ subsurface



More information: Next Presentation

*Wastewater Needs for Rural Underserved Communities-- the Alabama Black Belt*

Kevin White- University of South Alabama

# Clustered System Approach STEP/STEG (Septic Tank Effluent Pump/Gravity)



Trencher to dig 2-3 feet deep; insulated line for cold climates (on right).  
Or directional boring.  
Source: Siegrist, 2017

# Clustered System Approach

## STEP/STEG (Septic Tank Effluent Pump/Gravity)

- ▶ Each home has a septic tank that handles solids
- ▶ Septic Tank Effluent (STE, the liquids only) are conveyed to treatment
- ▶ No minimum velocity very flexible compared to conventional sewer (min ~2 ft/sec)
- ▶ Typically, 2 or 3-inch plastic pipe at only 2-3 ft depth of installation (account for freezing protection as needed)
- ▶ Smaller diameter pipe and no need for deep excavation; MUCH less expensive per mile
  - ▶ Estimates around \$35k per mile
- ▶ Can use hybrid STEP/STEG if some homes require pumping for conveyance

# Management Options

- ▶ Establish Responsible Management Entity
  - ▶ Local government
  - ▶ Community organization
  - ▶ Local or regional utility
  - ▶ Private company
- ▶ Responsibilities
  - ▶ System maintenance and repairs
  - ▶ Regulatory requirements
  - ▶ Customer billing

More information: Today 3:45-4:40 pm

*Understanding Sociotechnical Barriers to Decentralized Wastewater Management in the Rural Alabama's Black Belt*

Amal Bakchan- University of South Alabama

# Ordinances and Legal Considerations

- ▶ Overview of State Regulations
- ▶ Local Ordinances
- ▶ System Ownership
- ▶ System Permits
- ▶ Septage Disposal

# Funding Sources

- ▶ Report identifies more than 25 potential funding sources
- ▶ American Rescue Plan Act
  - ▶ \$5 million
- ▶ Bipartisan Infrastructure Investment and Jobs Act
  - ▶ \$50 million of funding for each of the fiscal years 2022-2026 (total of \$250 million)
  - ▶ Eligible households can receive grants up to \$15,000

# Funding Sources

## ▶ U.S. EPA

- ▶ Water Infrastructure Finance and Innovation Act (WIFIA)
- ▶ Wastewater Technologies Clearinghouse

## ▶ ADEM

- ▶ Clean Water State Revolving Fund (CWSRF)

## ▶ HUD

- ▶ Title 1 Home and Property Improvement Loans

## ▶ USDA

- ▶ Single Family Housing Repair Loans & Grants
- ▶ Community Development Block Grant
- ▶ Community Facilities Direct Loan & Grant Program
- ▶ Rural Utilities Service Water and Environmental Programs

## ▶ Rural Community Assistance Partnership (RCAP)

## ▶ Private

# Community Education and Outreach



Website



Brochures and  
Fridge Magnets



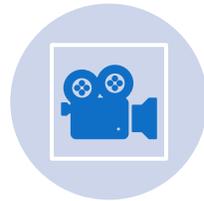
Local Townhall  
Meetings



Webinars



School  
Curriculum



Informational  
Videos

# Next Steps



**FINALIZE DRAFT**



**GATHER  
FEEDBACK FROM  
COMMUNITY  
PARTNERS**



**DISTRIBUTE TO  
LOCAL  
STAKEHOLDERS**



**SERVE AS AN  
EXAMPLE GUIDE  
FOR OTHER  
STATES**

# Inadequate Onsite Wastewater Treatment in U.S.

- ▶ **Failing Septic Systems**
  - ▶ Estimated 20 million or more systems with low repair/replacement rates
- ▶ **Straight Pipes**
  - ▶ Found in 15 states
- ▶ **Cesspools**
  - ▶ In at least 5 states (53 Mgal/day untreated sewage discharged in Hawaii)
- ▶ **Failing Outhouses**
  - ▶ Common sight in Navajo Nation, Texas Colonias, and parts of Alaska
- ▶ **Bucket Latrines**
  - ▶ Unpiped communities in Alaska
- ▶ **Open Defecation**
  - ▶ Estimated 580,000 people experiencing homelessness

# Acknowledgements

- ▶ Funding provided by U.S. EPA Gulf of Mexico for Reinventing Wastewater Management in the Black Belt (Cooperative Agreement MX-00D87019)

# Question?

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