Appendix C

ENVIRONMENTAL PUBLIC HEALTH

Healthy People Living In Healthy and Safe Environments

Presented by
Mary Glassburner
For

DHSS/DNR Onsite Waste Water Treatment Stakeholder Meeting August 1, 2011

Missouri Department of Health and Senior Services
Division of Community and Public Health
Section for Environmental Public Health

ENVIRONMENTAL HEALTH PERSPECTIVE

Discussion:

- Who. . .
- What. . .
- How. . .
- Why. . .
- History. . .
- Today. . .

DEFINITION

- Environmental Public Health and Protection*:
  - The art and science of protecting against environmental factors that adversely impact the quality of human health…
  - Nationally recognized environmental risk factors
    - Indoor environmental factors (lead, mold, asbestos, allergens, indoor air quality)
    - Food and water contaminants
    - Radiation
    - Toxic chemicals
    - Waste (human and solid)
    - Vectors
    - Safety hazards

*NEHA: National Environmental Health Association

PRIMARY ESSENTIALS NECESSARY FOR LIFE

Secondary Essentials

- Shelter
- Space

NECESSARY TO PROTECT HEALTH

- Characteristics of Essentials…
- Quantity: Capacity to sustain life
  - Volume/amount
  - Quality: Free from contamination
  - Have value
  - Does not harm

WHY DO WE CARE?

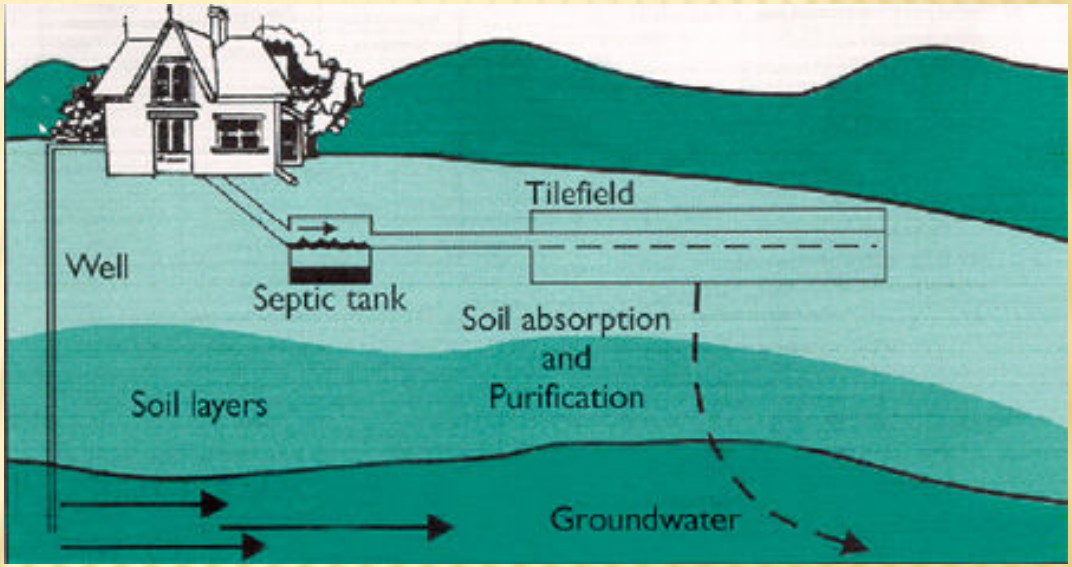
Typhoid, Cholera and Dysentery Epidemics

Infant Mortality Rates Drop

- **Immunizations--developed and used**
- **Safe Water & General Sanitation**
- **Increase Prenatal and Postnatal Care**
- **Pure Food and Drug Act**

REALLY–WHERE DOES IT GO?

Does Anyone Think About It ?



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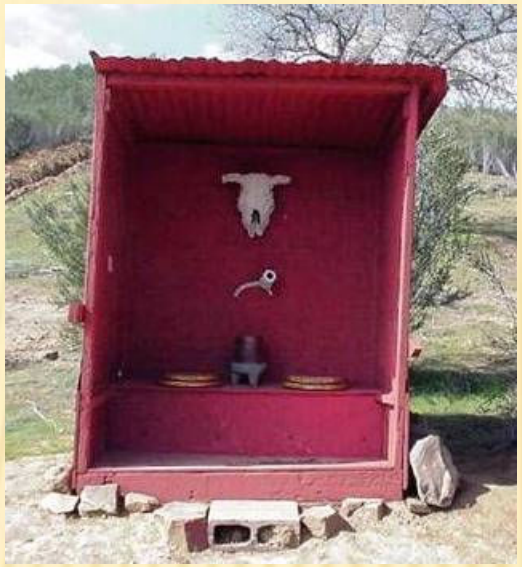
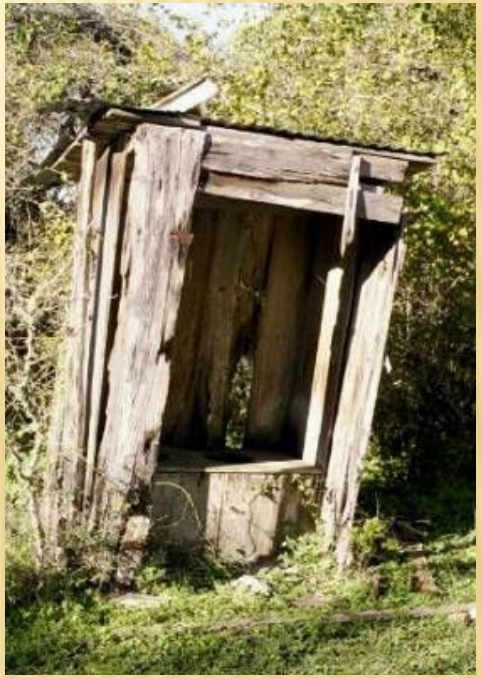
IN THE OLD DAYS…



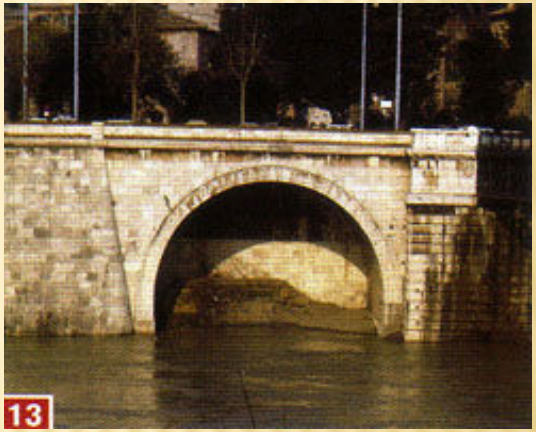


HISTORY OF SANITATION

- Sanitation In Ancient Times
  - Deuteronomy 23:12-13 “Thou shall have a place also without the camp, where you shall go forth; and you shall have a paddle upon your weapon; whereby you shall dig when you ease thyself, and shall turn back and cover that which cometh from you…”
  - Maintained cleanliness in camp
  - Hid offensive matter from sight and removed odors from camp

ROMAN ADVANCEMENTS (800-500 BC)

- Aqueducts
  - Advanced Water Systems
  - Public Baths
- First Sewers
  - 'Cloaca Maxima'
    - Engineered and constructed system
    - Drained surface water and household waste
    - Empties into the Tiber River
    - In use today



ANCIENT BABYLONIA EVIDENCE

- House drains and sewage disposal wells
  - 4,500 to 6,000 years ago
  - Up to 45’ deep
  - Large terra cotta sections
    - 19” diameter
    - Punctured /w small holes ¾” diameter
    - Capped at opening
- Ancient Greece: 350 BC
  - Hippocrates (Father of Medicine)
  - Warned of drinking or bathing in polluted water
  - Recommended boiling water for drinking

PROGRESS?

- Dark Ages—Fall of Roman Empire
  - Over 1,000 years intellectual darkness
  - “Uncleanliness is next to Godliness”
  - Filth, squalor, disease and death common
  - Crusades spread disease—Cholera, Typhoid, Plague

SANITATION PROGRESS

- 1500s sanitation 'improves'
- Sewers of London, Paris, Seville
  - 1550—1570s construction of sewers
    - King's Court--center
    - Dumped into natural water ways
- 17th & 18th century
  - Cesspools under houses
    - House & street drainage—rivers
  - Disease continues
  - Sporadic large epidemics

PROGRESS CONTINUES—1800'S

- Engineered sewage systems become more common in cities around the world
- America 1800's
  - Chicago: 1855-1860
  - Brooklyn, NY: 1856-1900
  - Philadelphia: 1870s
- European improvements spread

DISEASE EPIDEMICS

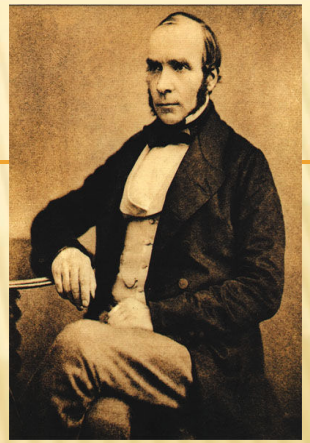
- Disease and Death Continue
  - Paris 1832: 'Great Cholera Epidemic'
  - London 1850s: Cholera and Typhoid epidemics
  - Memphis 1879-1890: Cholera & Yellow Fever
    - 5,150 people dead and thousands more ill
    - Spread to other states by refuges from Memphis
    - "Shotgun Quarantine" court ordered
    - Cellars used for cesspools—honeycombed under city
    - Pollution of ground and surface water systems
    - Congress organized National Board of Health

SCIENTIFIC BREAKTHROUGHS : 1850-1890

Robert Koch--Germany
Louis Pasteur--France
John Snow--London

- **Germ Theory**
- **Anthrax Vaccine**
- **Rabies Vaccine**
- **Pasteurization**
- **Aseptic Surgery**
- **Cholera & Typhoid Epidemiology**

ENVIRONMENTAL SANITATION



- London: Cholera Clusters—1854
  - Human waste from cesspools and street drainage
  - Seeped into ground water-contaminated wells
  - Proved the spread of disease from contaminate

ENVIRONMENTAL SANITATION REVEALED

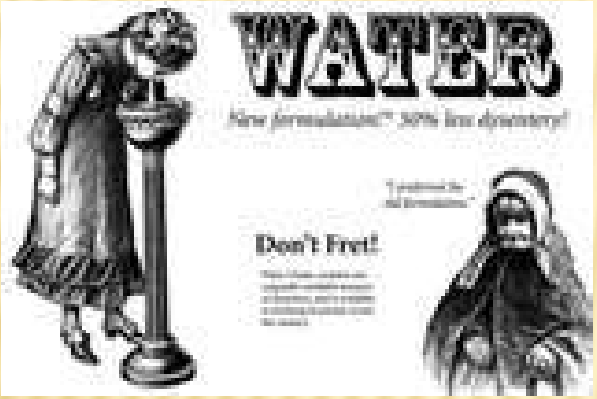
- Late 1860 – 1900
  - Understanding role of bacteria in decomposition
  - France & England
  - Patent on ‘Closed Vault’ treatment system (septic)
    - “Purification and decomposition”
    - Microbes change waste matter to “homogeneous slightly turbid fluid”
- Chemical process preferred—aseptic process
    - Destroys microbes
    - Lime

ASEPTIC VS SEPTIC SYSTEMS

- Institute of Civil Engineers—1887
- Realized need for ‘septic’ action
  - Decomposition of waste matter and removal of resulting ‘turbid fluid’
  - Actions arresting microbial action undesirable
- Mass State Board of Health adopted ‘septic’ systems as safe and preferred method for protecting public health

ENVIRONMENTAL HEALTH PROGRESS

Science

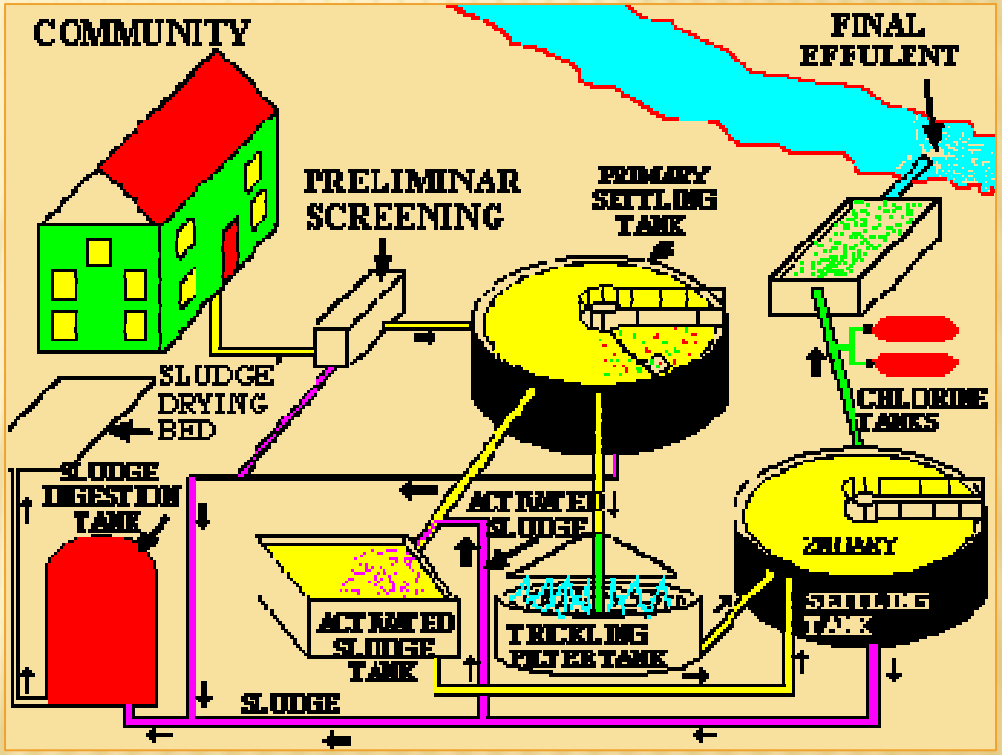


Public Health Education

Epidemiology

TODAY – UNITED STATES…

Modern Sewage Treatment Plants



TODAY – IN SOME AREAS OF THE WORLD

In many developing countries sewage is discharged without treatment.

OTHER AREAS OF THE WORLD

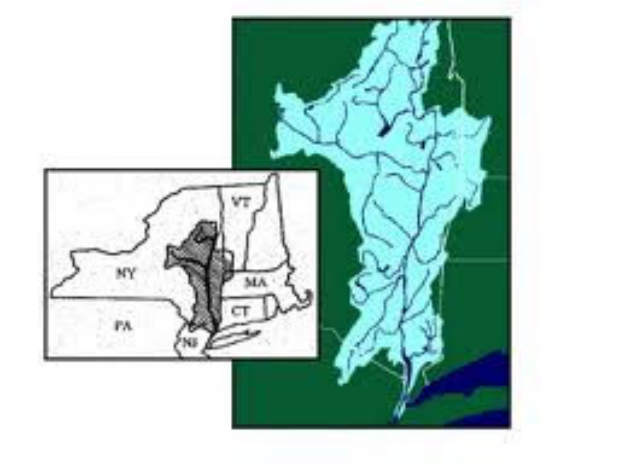
River Thames
(London England)

Seine River
(Paris France)

Events of sanitary sewer overflow were not uncommon and often polluted major rivers in developed countries.

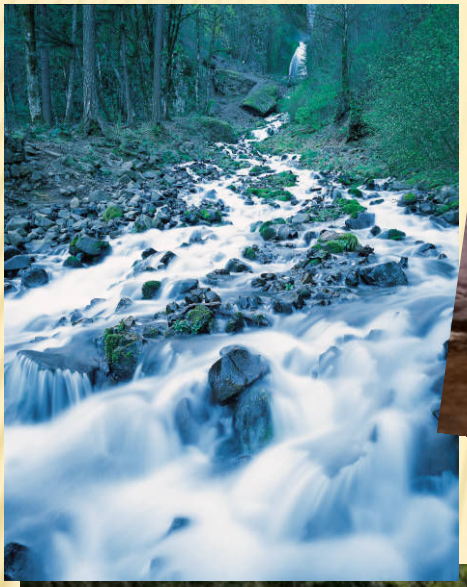
...IN OUR COUNTRY

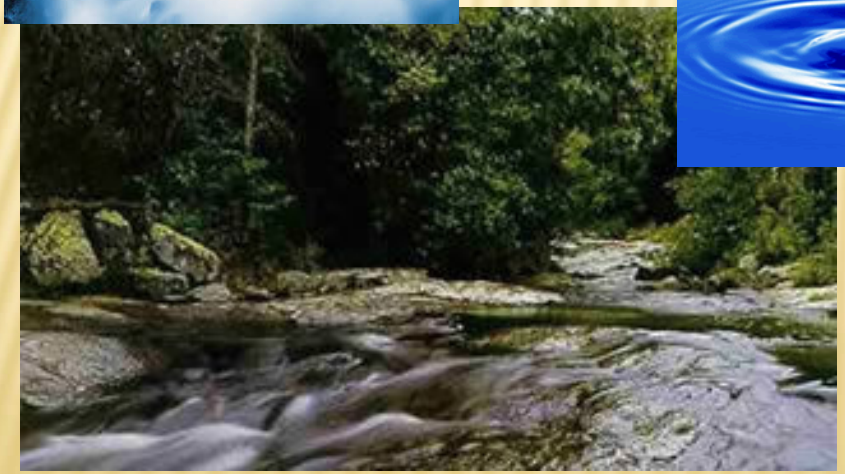
Hudson River



Events of sanitary sewer overflow are not uncommon and may pollute rivers, streams and other waterways.

TODAY. . . ASSURING HEALTHLY ENVIRONMENTS



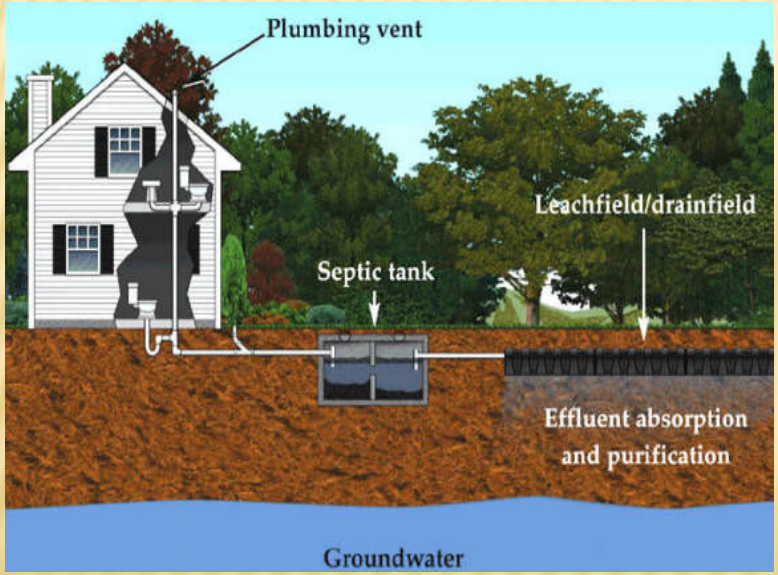


ONSITE WASTEWATER TREATMENT PROGRAM

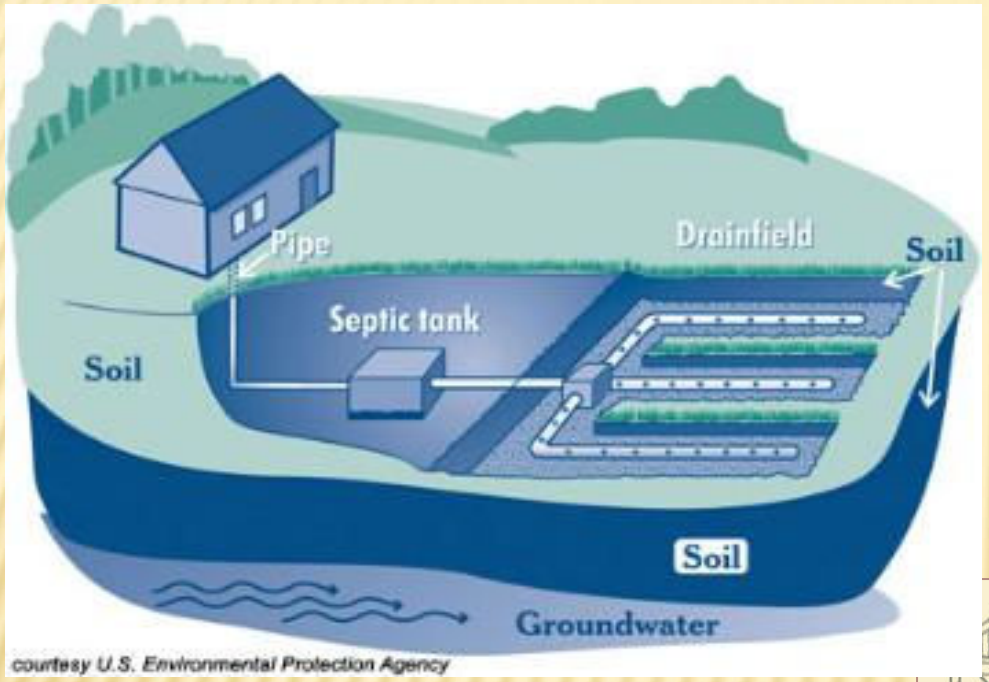
- Mission:
  - Assure a safe and healthy environment …
  - Prevent disease/death associated with wastewater
    - Exposure to inadequately treated wastewater
    - Contamination of water
- How?
  - Education—industry and public
  - Policy development and assurance
  - Implementation of minimum standards
  - Partnerships with EPA, DNR and LPHAs

MISSOURI–ONSITE WASTEWATER TREATMENT

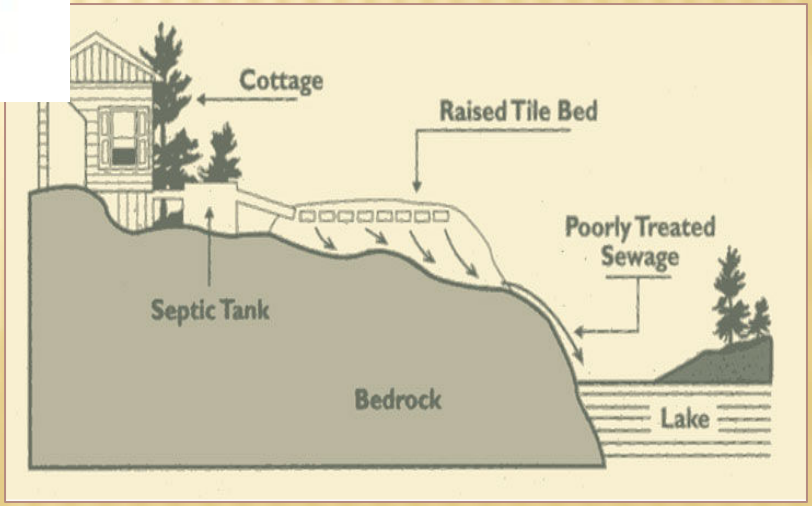
- **600,000+ households depend on onsite systems**
- **7,500+ new systems constructed, repaired, replaced**



PROTECTING HUMAN HEALTH & ENVIRONMENT



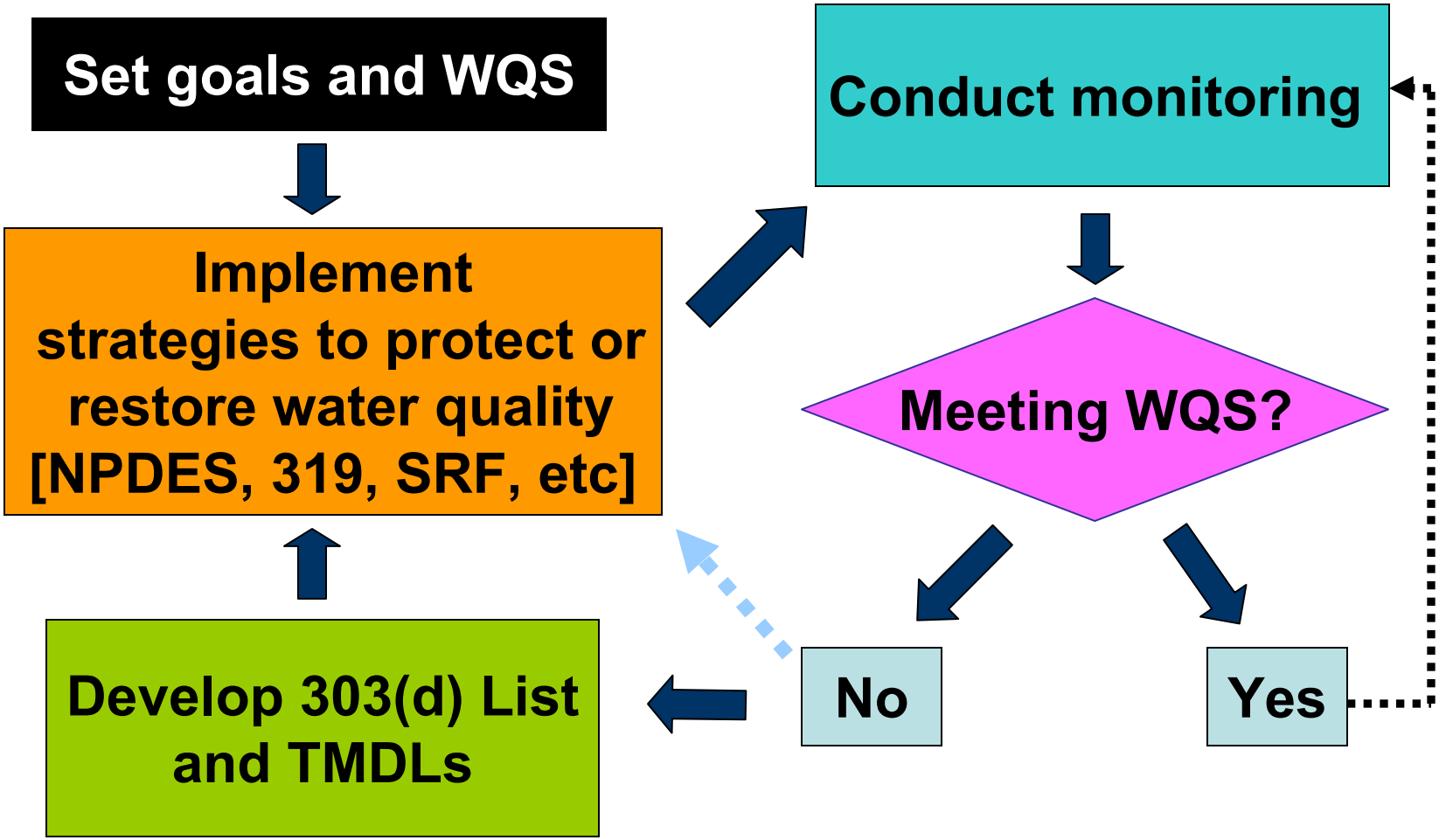
- **Effective Design**
- **Proper Installation**
- **Maintenance**



IT'S ALL CONNECTED !

Healthy People Living in Healthy & Safe Environments

Water Quality Based Process



Who Regulates Domestic Wastewater in Missouri?
August 01, 2011

Presented by
James Gaughan, P.E., MO-DHSS
Charles Harwood, Soil Scientist, MO-DNR

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MISSOURI DEPARTMENT OF
dhss
HEALTH AND SENIOR SERVICES

Missouri
Onsite Wastewater Treatment

- Onsite Systems Serve 1 in 4 Households (estimated)
- Over 600,000 Homes and Small Establishments

Onsite Wastewater Treatment Systems (On-Site Systems or Septic Systems)

Wastewater treatment takes place **on the site or lot** where it is generated

Onsite Jurisdiction includes multi-family **cluster systems** – treatment is near where wastewater is generated

Jurisdiction covers **domestic sewage only**

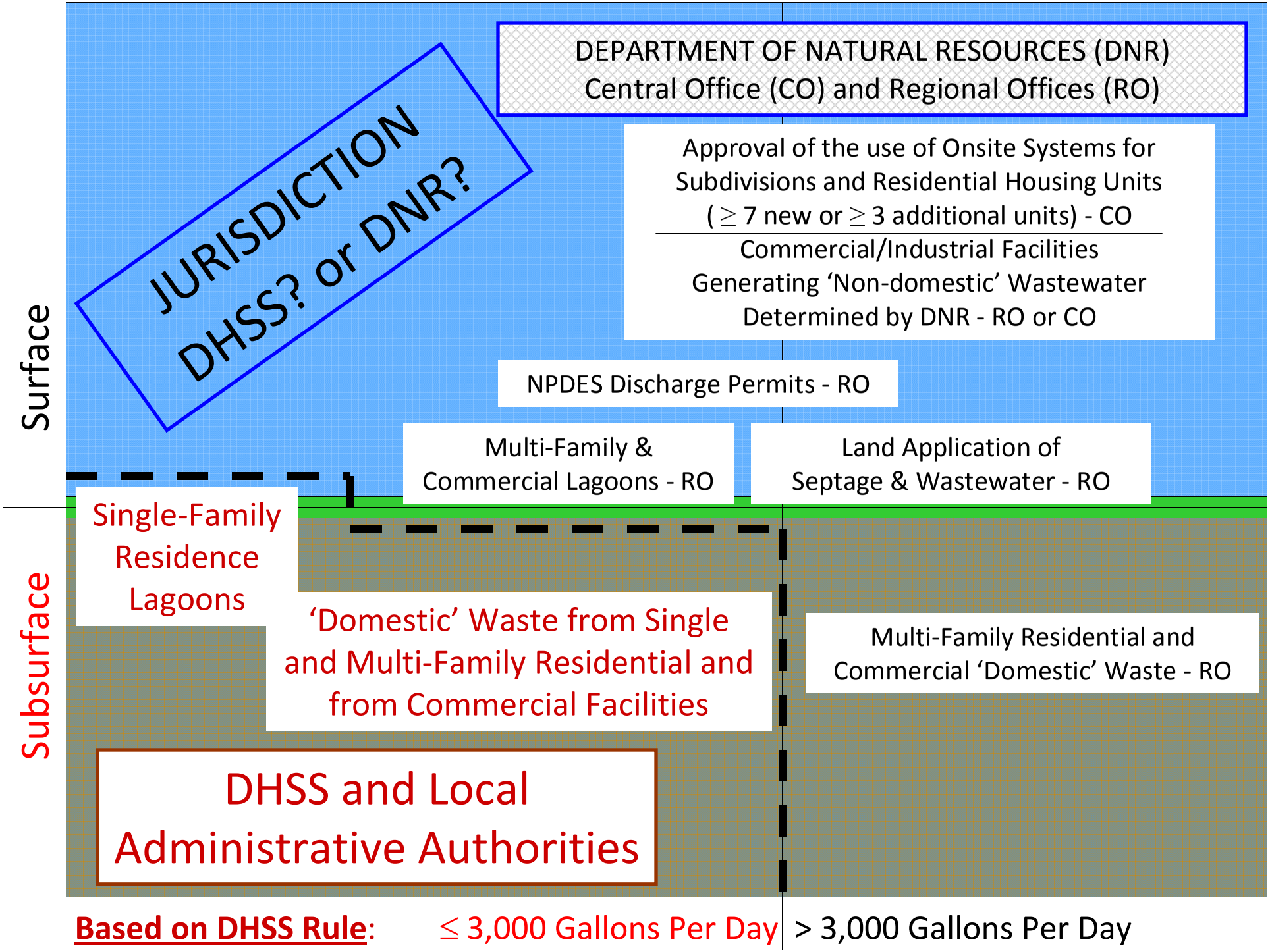

JURISDICTION
DHSS? or DNR?
DEPARTMENT OF NATURAL RESOURCES (DNR)
Central Office (CO) and Regional Offices (RO)
Approval of the use of Onsite Systems for Subdivisions and Residential Housing Units (≥ 7 new or ≥ 3 additional units) - CO
Commercial/Industrial Facilities Generating 'Non-domestic' Wastewater Determined by DNR - RO or CO
NPDES Discharge Permits - RO
Multi-Family & Commercial Lagoons - RO
Land Application of Septage & Wastewater - RO
Surface
Subsurface
Single-Family Residence Lagoons
'Domestic' Waste from Single and Multi-Family Residential and from Commercial Facilities
Multi-Family Residential and Commercial 'Domestic' Waste - RO
DHSS and Local Administrative Authorities
Based on DHSS Rule:
≤ 3,000 Gallons Per Day
> 3,000 Gallons Per Day

TABLE 2A–Quantities of Domestic Sewage Flows

Type of Establishment[1]	Flow
	(gallons per day per unit unless otherwise indicated)
Residential Units	
Single Family Dwelling	120/bedroom
Multiple Family Dwelling (with laundry capabilities)	120/bedroom
Multiple Family Dwelling (without laundry capabilities cottages)	95/bedroom
Mobile Home Parks	
Commercial Facilities	
Transportation terminals (airports, bu stations and the like)	
Laundromats	
Beauty Shops (Style Shops)	
Bowling Lanes	
Business (other than those listed else	
Factories (exclusive of industrial was add for showers	
Marinas with bathhouse	
Motels/Hotels with cooking facilities	
Offices (per shift)	
Service Stations	
24-hour Service Stations	
Theaters: Movies	
Drive-in	
Warehouses	
Public parks (toilets only)	
Public parks with bath house	
Camps	
Construction or Work Camps	
Summer Camps	
Campgrounds–with Comfort Station and sewer hookups)	
Travel Trailer/Recreational Vehicle P (with water and sewer hooku	
Assembly & Mercantile	
Retail Stores	

TABLE 2A–Quantities of Domestic Sewage Flows (continued)

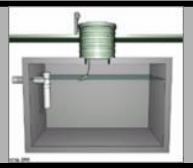
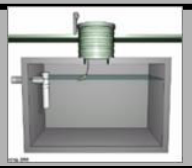
Type of Establishment[1]	Flow
Food or Drink Establishment**	
Bar (not serving food)	20/seat
Restaurants	40/seat or 40/15 sq. ft. of dining area, whichever is greater
24-hour Restaurant	75/seat
Food Stands	
1) per 100 square feet of food stand floor space	50 gal.
2) add per food employee	25 gal.
Other food service facilities	5/meal
Meat Markets	
1) per 100 square feet of market floor space	50 gal.
2) add per market employee	25 gal.
Institutional**	
Hospitals	300/bed
Day Care Facilities	15/person
Residential Care Facilities	60/person
Rest Homes and Nursing Homes	
with laundry	120/bed
without laundry	60/bed
Day Schools	
with cafeteria, gym, and showers	15/student
with cafeteria only	12/student
with neither cafeteria nor showers	10/student
Boarding Schools	60/person

[1] Establishments with flows greater than three thousand gallons per day (3,000 gpd) shall be regulated under Chapter 644, RSMo, administered by the Department of Natural Resources.

* Must consider flow into the soil absorption system from mobile homes where taps are allowed to run to prevent freezing.

** Establishments processing food may be required to provide grease interceptors in an accessible location prior to the sewage treatment system.

Onsite System Jurisdiction

Type of System	Single-Family Residences	Multi-Family Residences and Small Businesses or Organizations **3,000 gallons per day or less**
Soil Treatment	√ YES	√ YES
Wastewater Lagoons	√ YES	X NO
Holding Tanks	√ YES 	√ YES 
Privies, Waterless Toilets, Beneficial Reuse	√ YES	√ YES

Statute Exemptions and Limitations

Single-family residence lot owners of 3 acres or more

Multi-family residence lot owner's of 10 acres/residence (conditions apply)

Existing systems not inspected (unless there are reasonable grounds to believe there has been a violation)

Complaints investigated only if received from aggrieved party or adjacent landowner or as part of a disease investigation

Complaints Investigated

1200
1000
800
600
400
200
0

2006
2007
2008
2009

Complaints Investigated
Notice of Violation-NOV
Voluntary Compliance
NOVs Referred*
* Not asked in 2006
Prosecutory Compliance

Minimum
Construction Standards

- Site/soil evaluation
- Daily wastewater flows
- Separation distances
- Type/size of sewage tanks
- Size of single-family lagoons
- Type/size of soil treatment system
- Alternative engineer designed systems
- Allows other engineer designed systems

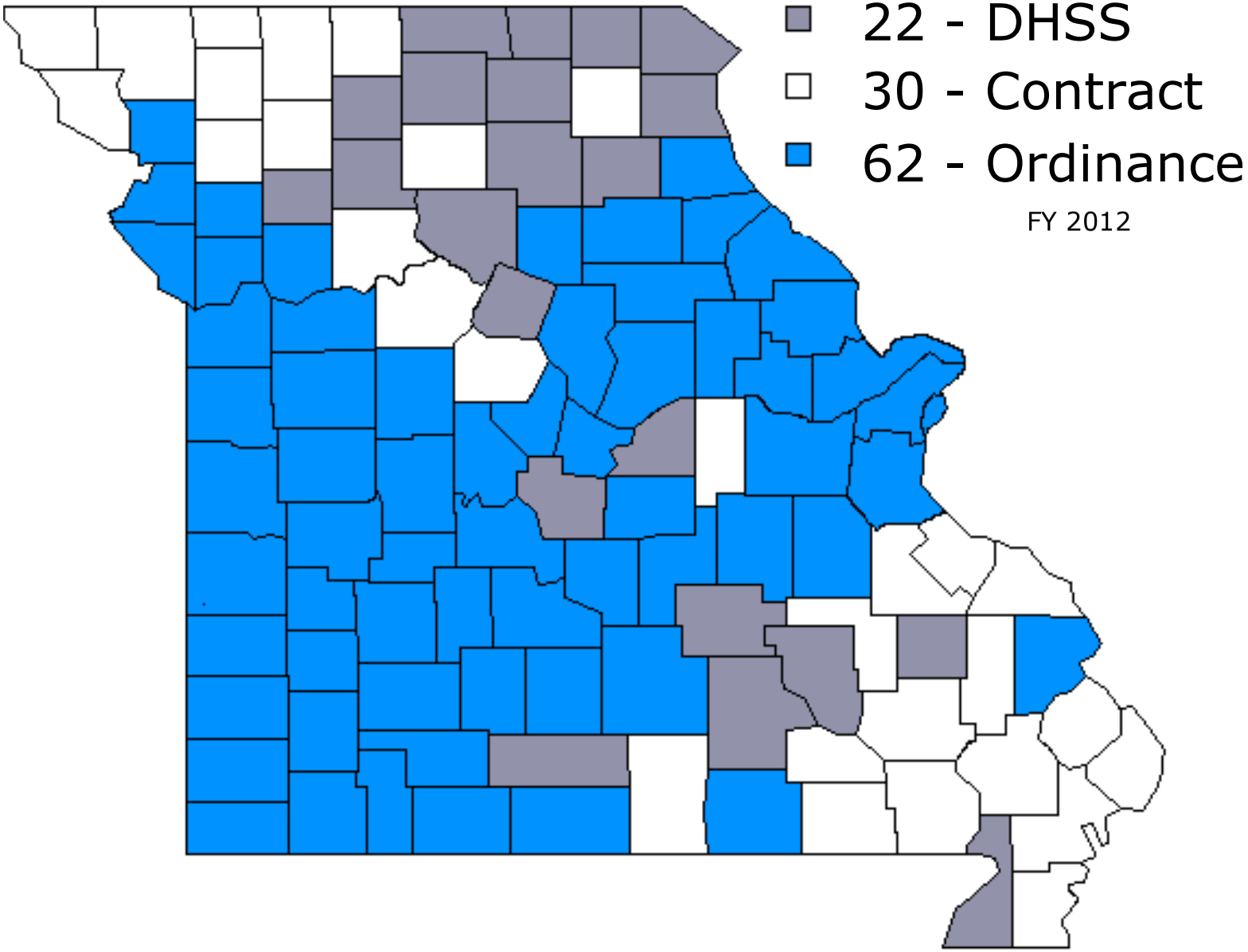
Management
Operation & Maintenance

Managed onsite and cluster systems can be a **cost-effective and long-term** option for meeting public health and water quality goals

Proper operation and maintenance of onsite systems is essential for **sustainable systems**

Adoption of *Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems*

Permitting Authority

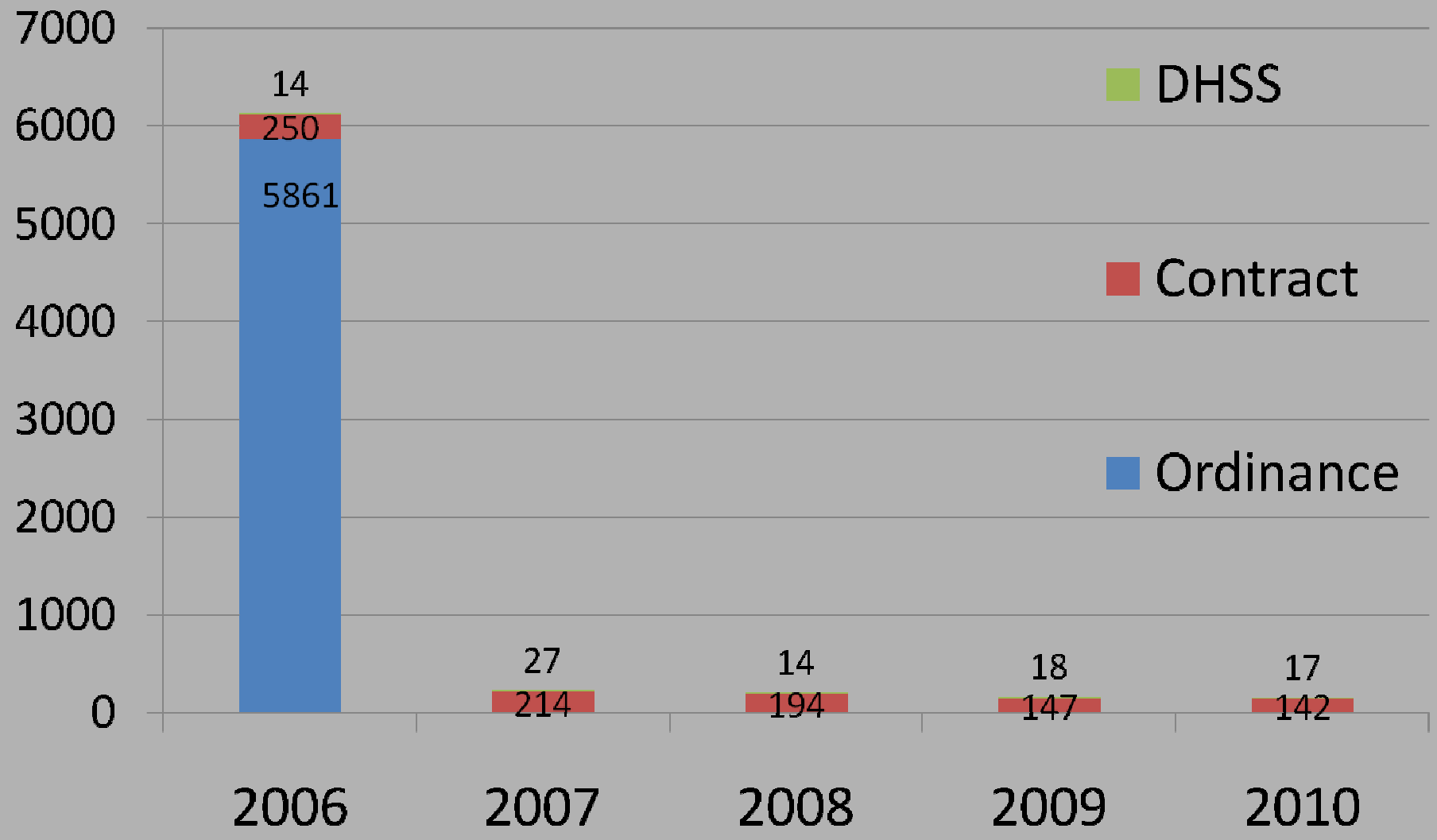


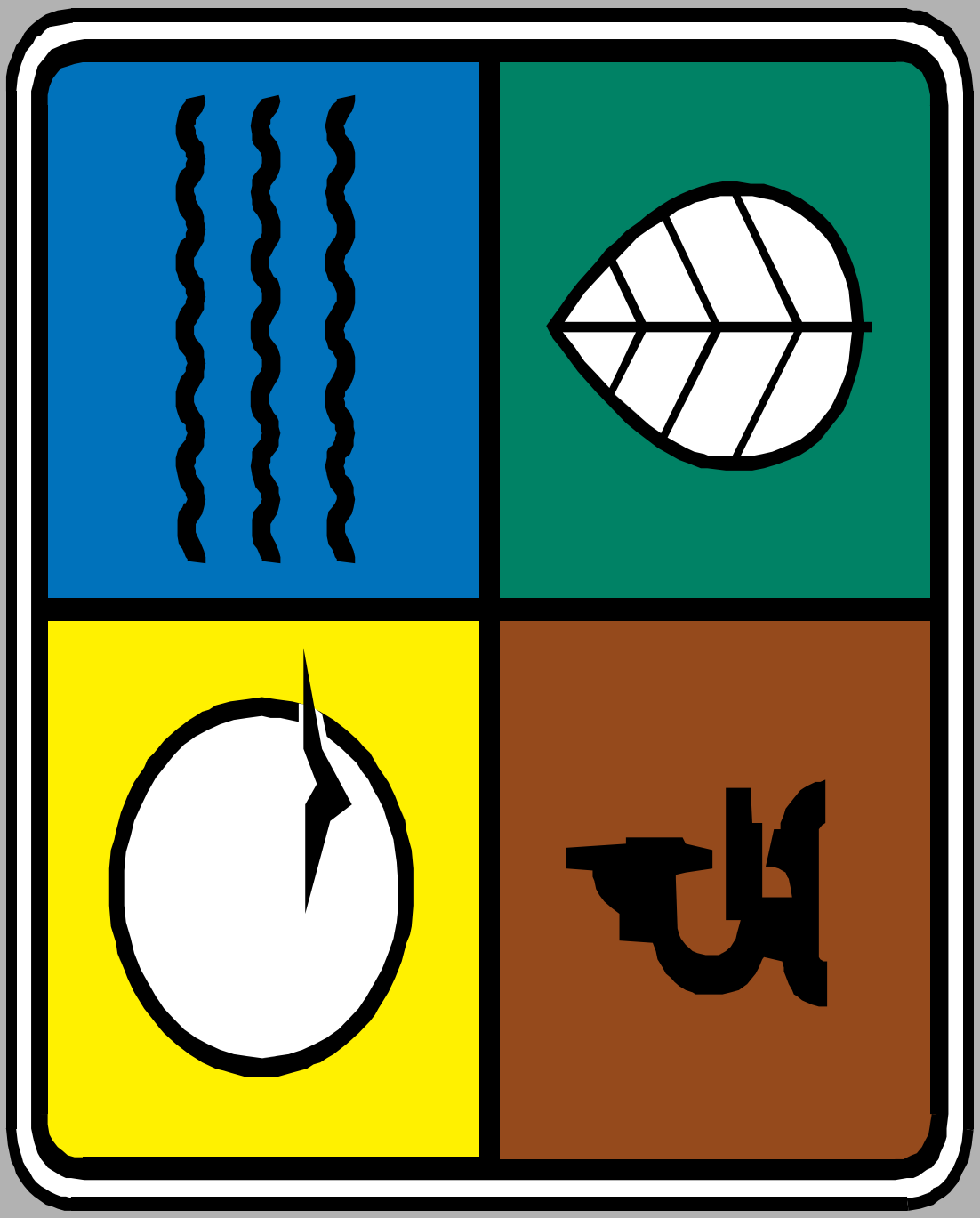
Authority Under Local Ordinance

Local regulations are to be as strict as state minimum regulations – may be more stringent

- Require all systems to be permitted (no acreage exemption)
- Accept only soil morphology reports
- Set more conservative size requirements
- Conduct final inspections of all systems
- Require maintenance contract or operating permit
- Require real estate transfer inspections

Onsite Construction Permits





Domestic Wastewater Defined

- 701.025 (12) defines it as: "...human excreta and wastewater, including bath and toilet waste, residential laundry waste, residential kitchen waste and other similar waste from household or establishment appurtenances..."

DNR-WPCB
(Central Office)

- Single Family Residential Housing Developments (Subdivisions)
- Multiple Family Residential Housing
- Recreational Developments

DNR - Regional Office

- Other Sources of Domestic Sewage

  with flows ≤3,000 gpd, including multi-family, commercial and restaurants that **DO NOT** discharge into a subsurface soil absorption system (e.g. Lagoon and other discharging system).

DNR
(Regional Office or Central Office)

- **Any Wastewater Flow** >3,000 GPD

- **All Industrial Waste Flows,** which is anything not defined as domestic sewage.

Domestic Wastewater Does not Include

- It does not include process wastewaters, such as those from meat processing plants, wineries, cheese making facilities, mortuaries, truck/automobile service garages with floor drains, veterinary clinics, surgery suites, kennels, live fish bait operations, bio-fuel production facilities, and any other non-domestic wastes from commercial or industrial facilities.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
REGIONAL AND SATELLITE OFFICES

Kansas City Area

Kansas City Regional Office
500 NE Colbern Rd.
Lee's Summit, MO 64086-4710
816-622-7000
FAX: 816-622-7044

Northwest Missouri Satellite Office
Northwest Missouri State University
Environmental Services Building,
800 University Dr.
Maryville, MO 64468-6015
660-562-1876 or 660-562-1877
FAX: 660-562-1878

Truman Lake Satellite Office
Harry S Truman State Park
28761 State Park Road West
Warsaw, MO 65355
660-438-3039
FAX: 660-438-5271

Southwest Area

Southwest Regional Office
2040 W. Woodland
Springfield, MO 65807-5912
417-891-4300
FAX: 417-891-4399

Lake of the Ozarks Satellite Office
Camden County, 5570 Hwy. 54,
Osage Beach, MO 65065
2040 W. Woodland
Springfield, MO 65807-5912
573-348-2442
FAX: 573-348-2568

Newton County Satellite Office
Crowder College
601 Laclede, Smith Hall, Room 201
Neosho, MO 64850
417-455-5180 or 417-455-5158
FAX: 417-455-5157

Northeast Area

Northeast Regional Office
1709 Prospect Drive
Macon, MO 63552-2602
660-385-8000
FAX: 660-385-8090

Boonville Satellite Office
320 First St.
Boonville, MO 65233
660-882-1540
FAX: 660-882-1544

Kirksville Satellite Office
Truman State University
Magruder Hall, Room 3068
100 E. Normal St.
Kirksville, MO 63501
660-785-4610

Department Central Offices
P.O. Box 176
Jefferson City, MO 65102-0176
573-751-3443
www.dnr.mo.gov/shared/map-jeffcity.htm

St. Louis Area

St. Louis Regional Office
7545 S. Lindbergh, Ste 210
St. Louis, MO 63125
314-416-2960
FAX: 314-416-2970

Franklin County Satellite Office
Meramec State Park
Hwy. 185 S.
Sullivan, MO 63080
573-860-4308
FAX: 573-468-5051

Jefferson County Satellite Office
Eastern District Parks Office
Hwy. 61
Festus, MO 63028
636-931-5200
FAX: 636-931-5204

Lincoln County Satellite Office
Cuivre River State Park
678 State Rt. 147
Troy, MO 63379
636-528-4779
FAX: 636-528-5817

Southeast Area

Southeast Regional Office
2155 North Westwood Blvd.
Poplar Bluff, MO 63901
573-840-9750
FAX: 573-840-9754

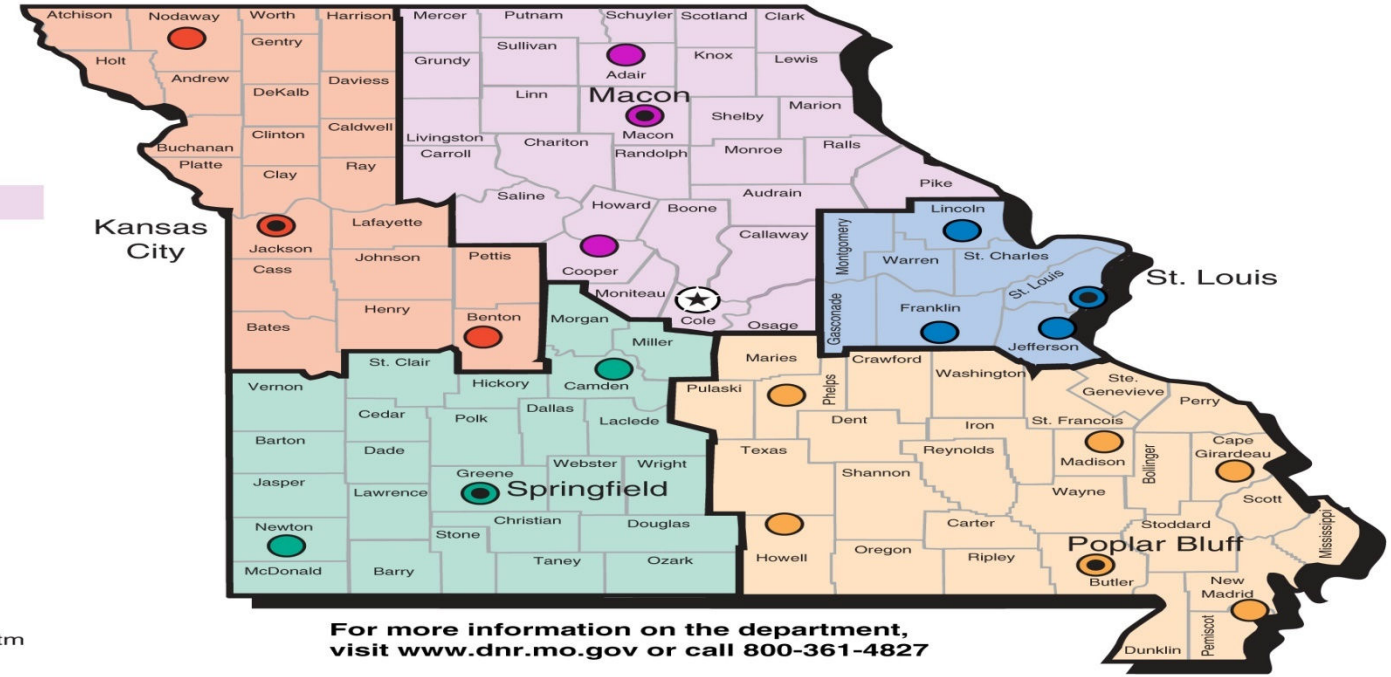
Cape Girardeau County Satellite Office
2007 Southern Expressway
Cape Girardeau, MO 63701
573-651-3008 (phone and FAX)

Delta Center Satellite Office
P.O. Box 160
Portageville, MO 63873
573-379-5431
FAX: 573-379-5875

Howell County Satellite Office
700 W. Main St.
Willow Springs, MO 65793
417-469-0025 (phone and FAX)

Madison County Satellite Office
120 W. Main St.
Fredericktown, MO 63645
573-783-2385
FAX: 573-783-6294

Rolla Satellite Office
111 Fairgrounds Rd.
Rolla, MO 65402
573-368-3625
FAX: 573-368-3912



For more information on the department, visit www.dnr.mo.gov or call 800-361-4827

12/2010 www.dnr.mo.gov/regions/ro-map-color.pdf

MO-DNR Resource Material

- MO-DNR: www.dnr.mo.gov
- Permit Assistant: www.dnr.mo.gov/mopermitassistant/
- Publications (FACT SHEETS): http://dnr.mo.gov/pubs/index.html

MO-DNR Resource Material

- Forms & Permits:
  http://dnr.mo.gov/forms/index.html
- Laws & Regulations:
  http://dnr.mo.gov/assistance/laws-regulations.htm
- Interactive Mapping Services:
  http://www.dnr.mo.gov/internetmapviewer/

MO-DHSS Resource Material

- MO-DHSS: www.health.mo.gov
- Onsite Wastewater Program: http://health.mo.gov/living/environment/onsite/
- Laws, Regulations and Manuals: http://health.mo.gov/living/environment/onsite/lawsregs.php
- Onsite Sewage Authority Map: http://health.mo.gov/living/environment/onsite/pdf/onsiteauthoritymap.pdf

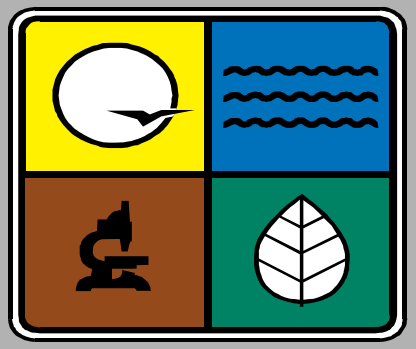
MO-DHSS Resource Material

- Applications & Forms: http://health.mo.gov/living/environment/onsite/appsforms.php
- Related Links: http://health.mo.gov/living/environment/onsite/links.php
- Frequently Asked Questions: http://health.mo.gov/living/environment/onsite/faqs.php

QUESTION to the STAKEHOLDERS

- How many of you here understand the line of jurisdiction between the DNR & DHSS Onsite Wastewater Program?

THANK YOU



573-751-1300

www.dnr.mo.gov

573-751-6095

www.health.mo.gov

HOUSE BILL 89 ONSITE WASTEWATER STAKEHOLDER MEETING

2nd meeting
September 8, 2011

Crystal Lovett, MO DNR Facilitator, and DNR-DHSS Panel

701.058: "The departments shall evaluate the data and information obtained and present their findings and recommendations in a report to be submitted to the general assembly by December 31, 2011."

Reminder of Report

- Some proposed solutions require a change in **LAW** from the General Assembly and Governor[S]

- Some proposed solutions require a change in **RULES** from the Department(s)[R]

- Some proposed solutions would not need changes in law or rule, but may require additional **resources**[$]

Reminder on Changes

- Existing resources are fairly static
- Wastewater universe is not static
- County ordinances can be effective in dealing with some challenges

Reminder on Resources

Opportunities for Moving Forward

- Improve customer service
  - Wastewater Internet Portal$
    - Identify jurisdictional authority, access rules, pay permit fees, obtain applications, explore funding sources, find professionals, find trainings, news/updates etc.
  - Public Service Announcements$
- Streamline processes
  - Update onsite wastewater treatment rules^{R}
  - Update residential housing rule^{R}
  - Professional registrations^{SR}
  - Fee/license structures^{SR}

Review Comments From First Meeting

1) Permitting Wastewater Treatment Systems
2) Malfunctioning OWTS
3) Funding Assistance
4) Simplification/Clarification of Jurisdiction
5) No Discharge Lagoons
6) Septage Haulers (Pumpers)

Discussion

- Wastewater treatment for small lots
- Less than 7-lot subdivisions
- Soil treatment in high clay soils
- Limited prescriptive options
- 3-acre exemption – oversight gap, misinterpretation
- Inadequate oversight of soil evaluator & engineers
- Inconsistent regulation (DHSS-county/county-county)
- Inflexible regulations

1.) Challenges: Permitting Wastewater Treatment Systems

- Rewrite construction standards[R]
- Alternative systems[R]
- Performance standards[R]
- Efficiency/reuse/green standards[R]
- Reduce need for variance approval[R]
- Surface discharging systems[SR]

1.) Stakeholder Solutions: Permitting Wastewater Treatment Systems

- Lack of onsite wastewater treatment system (OWTS) maintenance
- Education of system owners
- OWTS lifespan
- OWTS enforcement priorities

2.) Challenges: Malfunctioning OWTS

- Required maintenance for advanced/performance systems[SR$]
- Property transfer inspections[S$]
- Education/public service announcements[$]

2.) Stakeholder Solutions: Malfunctioning OWTS

- Equity in funding wastewater systems – central vs. decentralized
- Funding eligibility requirements
- Timely funding for urgent decentralized system repairs

3.) Challenges: Funding Assistance

- Increase SRF funding availability e.g. funding in the Upper White River Basin$
- Use of more 319 grants, especially for PSAs$

3.) Stakeholder Solutions: Funding Assistance

- Regulation of developments with less than 7-lots
- Clarify and possibly modify the lines of jurisdiction

4.) Challenges: Simplification/ Clarification of Jurisdiction

- Collaboration between DHSS and DNR[SR$]
- Ongoing (permanent) stakeholder meetings[$]
- DHSS single-family homes vs. DNR multifamily and business systems[SR$]
- DHSS subsurface domestic vs. DNR surface discharging systems[SR$]
- DHSS ≤3,000 GPD vs DNR >3,000 GPD[SR$]

4.) Stakeholder Solutions: Simplification/Clarification of Jurisdiction

4.) Jurisdiction Options

- DHSS Jurisdiction for all wastewater treatment
- DHSS Jurisdiction for all subsurface wastewater treatment
- No change in current jurisdiction
- DNR Jurisdiction for all wastewater treatment except single-family residences
- DNR Jurisdiction for all wastewater treatment

- Inadequate oversight and regulation of exempt no discharge lagoons

5.) Challenges: No Discharge Lagoons

- Revise rules so they are properly designed, installed, and maintained[R$]
- Reevaluate Jurisdiction

5.) Stakeholder Solutions: No Discharge Lagoons

- Inadequate oversight and regulation of septage haulers
- Illegal septage dumping

6.) Challenges: Septage Haulers (Pumpers)

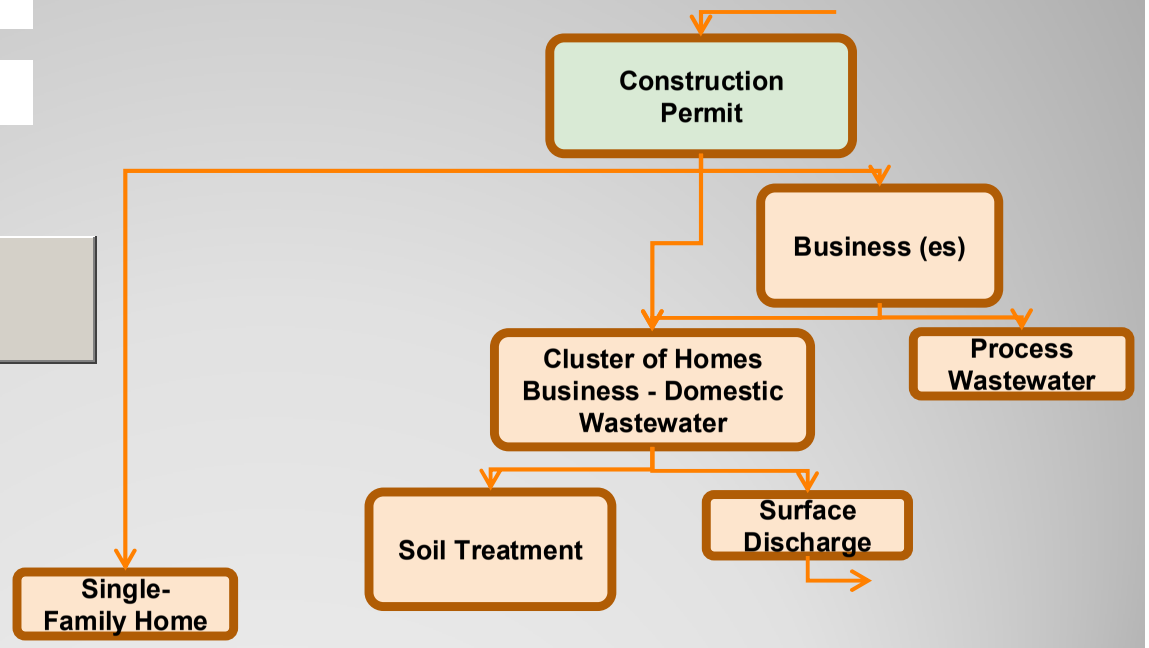
- Regulation of pumpers or waste haulers[S$]
- Track waste loads[S$]

6.) Stakeholder Solutions: Septage Haulers (Pumpers)

Do you need to construct or modify a wastewater treatment system for a:

- Single-family residence
- Cluster of residences
- Business(es)

NEXT

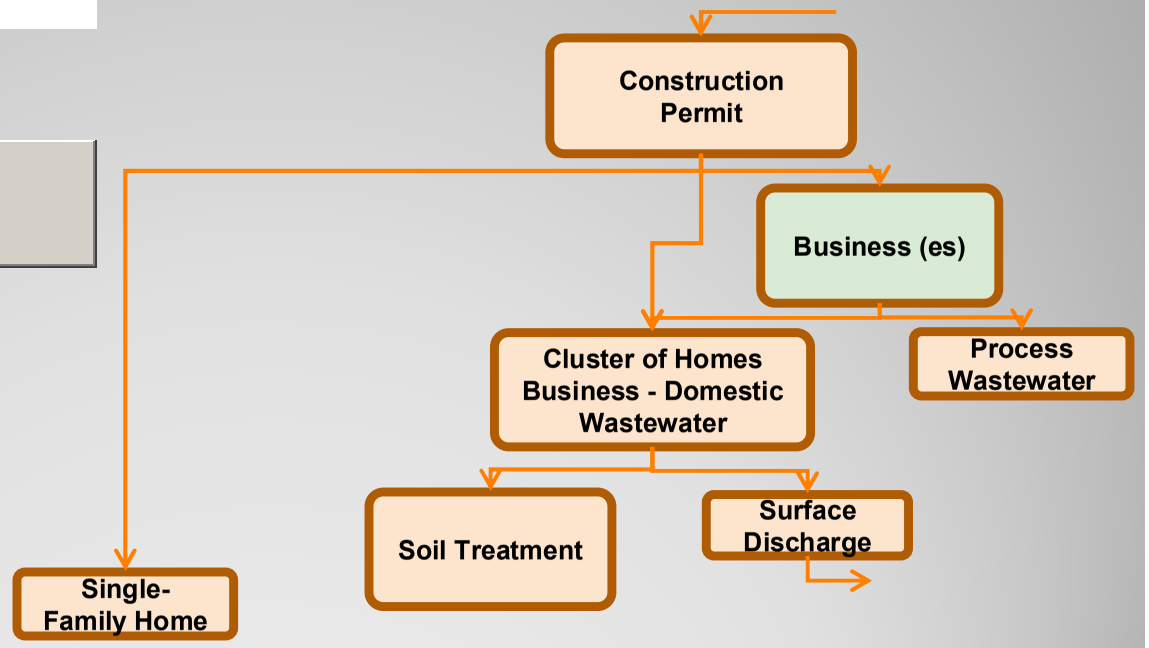


Portal Illustration

Does the business generate domestic wastewater only or process wastewater:

- Domestic wastewater only
- Process wastewater

NEXT



Portal Illustration

Will the wastewater system discharge into a soil treatment system or to the ground surface:

- Soil treatment system
- Surface discharge

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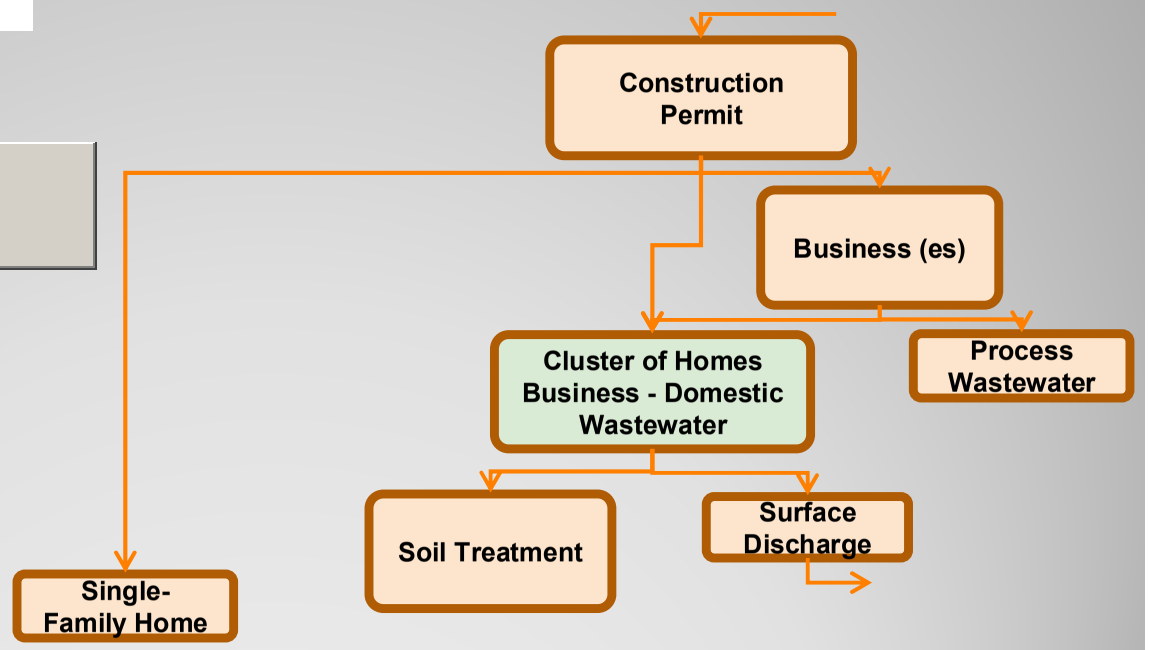
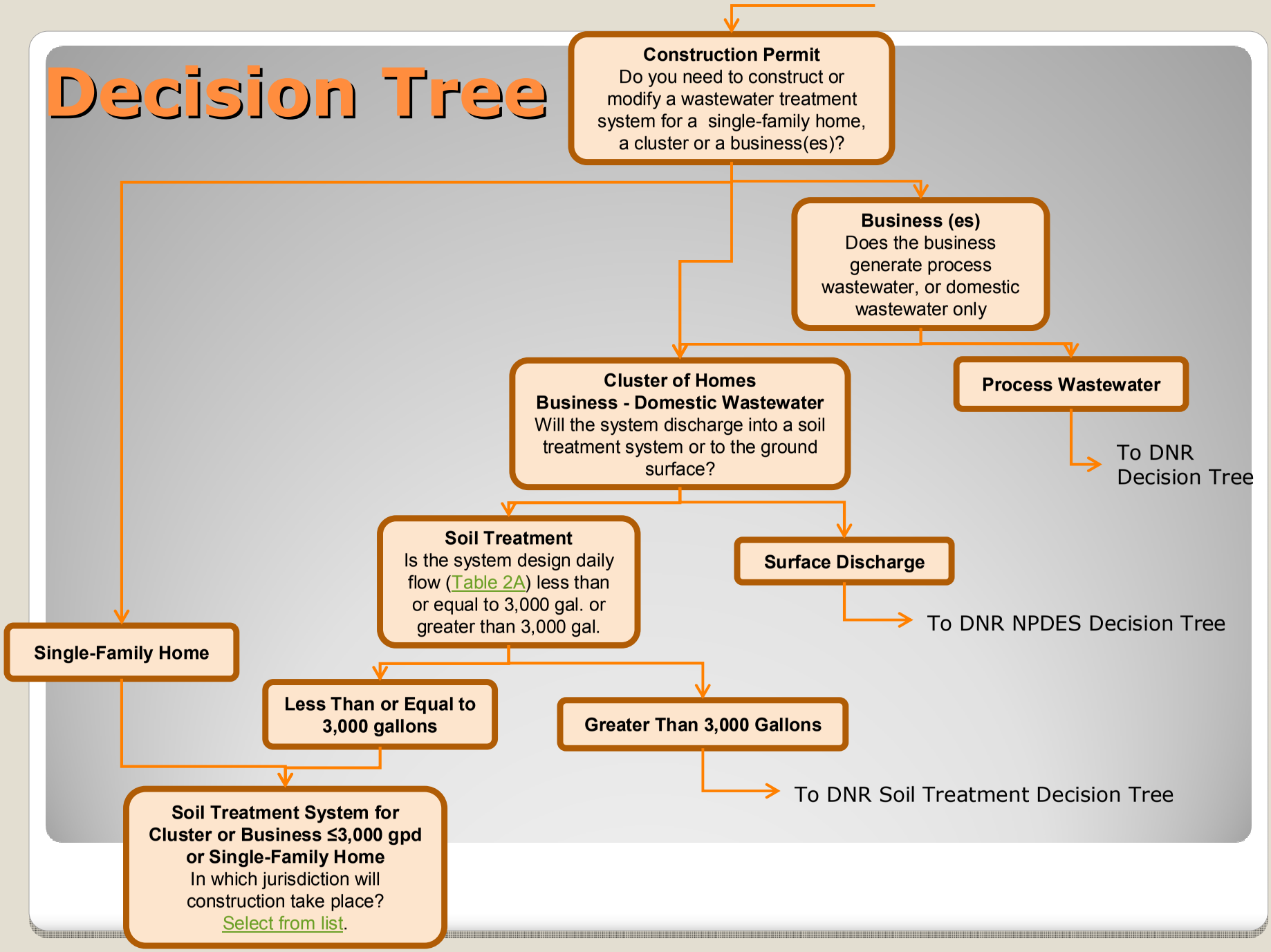


Portal Illustration

Decision Tree



Decision Tree

Construction Permit
Do you need to construct or modify a wastewater treatment system for a single-family home, a cluster or a business(es)?

Soil treatment systems may include:
A pretreatment component
Gravity, dosed, or pressure distribution
Absorption lateral trenches
Shallow pressure laterals
At-grade or mound dispersal
Shallow drip irrigation dispersal
Modified drip irrigation

A ***cluster*** wastewater treatment system serves more than one home or business

Business (es)
Does the business generate process wastewater, or domestic wastewater only

Process Wastewater

To DNR Decision Tree

Cluster of Homes
Business - Domestic Wastewater
Will the system discharge into a soil treatment system or to the ground surface?

Soil Treatment
Is the system design daily flow (Table 2A) less than or equal to 3,000 gal. or greater than 3,000 gal.

Surface Discharge

To DNR NPDES Decision Tree

Single-Family Home

Less Than or Equal to 3,000 gallons

Greater Than 3,000 Gallons

To DNR Soil Treatment Decision Tree

Soil Treatment System for Cluster or Business ≤3,000 gpd or Single-Family Home
In which jurisdiction will construction take place?
Select from list.

Questions?

Next Steps…