Overview of Septic Systems

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Objectives

Topic: Overview of Septic Systems in Florida

- Review Onsite Sewage Treatment and Disposal Systems in Charlotte County
- Understand basic functioning of septic systems
- Review proper maintenance of septic systems
- Understand options for higher level of treatment (aerobic treatment units and performance-based treatment systems)
- Introduce Springs Protection Basin Management Action Plans (BMAP) as an example of stricter requirements
Onsite Sewage Treatment and Disposal Systems (OSTDS)

- Are individual wastewater treatment systems where sewer is not available
- Are permitted by the Florida Department of Health in Charlotte County
- Usually, are a septic system consisting of septic tank and drainfield
- Can include treatment types other than conventional systems:
  - Aerobic Treatment Units and Performance Based Treatment System
Searchable Web Application

https://gis.flhealth.gov/FLWMI
Septic Tank and Drainfield
(A Septic System)
Septic Tank

Multi-compartment Septic Tank
Functions of a Septic Tank

- Sedimentation in scum & sludge layers
- Digestion of solids without oxygen
- Storage of scum and sludge

Clarified effluent from clear zone flows to the drainfield.
Indigestible Materials to Avoid

- coffee grounds
- cooking fats & grease
- wet strength towels
- disposable diapers
- cigarette butts
- plastics
- kitty litter
Conventional Septic System

The Old Way: Pipe and Gravel
The Drainfield (Treatment and Disposal)

- 6” minimum between top of drainfield and ground surface required
- Thickness of drainfield (12” for gravel)
- 2 feet between bottom of drainfield and seasonal high water table now required to provide air and soil treatment
Most pollutants other than nitrate are treated in drainfield.
Mound as Alternative Drainfield

• Mound system is a septic system alternative that allows separation of drainfield from groundwater or rock.
Modern conventional septic and drainfield systems are effective at removing organic carbon, suspended solids, and bacteria.

However, these systems are not designed to effectively remove nitrogen.
How to take care of your system?

1. Know where it is

2. Three P’s
   - **Pump/inspect** for accumulation of sludge
   - **Protect** outside (never drive on it; direct rainfall away)
   - **Prevent** malfunction inside (flush only human waste, no toxics, fix leaky toilets)
“Advanced” OSTDS

- advanced aerobic systems
- performance-based septic tanks
- nitrogen-reducing septic systems
- high-performance septic systems

In the news:
- souped-up septics
- enhanced systems
- improved septic tanks
- more efficient septic tanks
- advanced septic systems
- more-advanced septic system
- performance-based septic systems
In-Ground Nitrogen Reducing Biofilter

- A nitrate-reducing, filter layer below drainfield; material reacts with nitrate
- Rules became effective July 31, 2018
Aerobic Treatment Unit (ATU)

Permitting Category
“A sewage treatment unit which introduces air into sewage to provide biochemical stabilization within a treatment receptacle”, Rule 64E-6.002(2).

Three main types of treatment technologies:
• Extended Aeration - Air bubbled through water
• Fixed Media Filters - Water sprinkled through air or loose filter material
• Combined - Extended aeration and fixed media
Aerobic Treatment Unit

About 8,000 NSF 40 units installed in Florida
## Aerobic Treatment Unit Certification to meet NSF/ANSI Standard 40

<table>
<thead>
<tr>
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<th>“Typical” Septic Tank Effluent</th>
<th>NSF 40 Standard for 30-day Average</th>
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<tbody>
<tr>
<td>CBOD₅ Carbonaceous Biochemical Oxygen Demand</td>
<td>216 mg/L</td>
<td>25 mg/L</td>
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<tr>
<td>TSS (total suspended solids)</td>
<td>61 mg/L</td>
<td>30 mg/L</td>
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<tr>
<td>Microbe Reduction</td>
<td>loaded</td>
<td>99.9% (not part of standard but typical, not disinfection)</td>
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Certified to meet NSF/ANSI Standards 40 and 245 (50% Nitrogen Reduction)

Newer: Nitrogen-Reducing ATU

Aeration Chamber

Sewage

Recycle for more denitrification

Drainfield
## Aerobic Treatment Units

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Additional requirements</th>
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<tr>
<td>Much higher treatment (greater reduction in BOD and TSS)</td>
<td>Operating expense</td>
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<tr>
<td>Can extend drainfield life</td>
<td>Most require electricity</td>
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<td>Reduced drainfield size</td>
<td>More frequent routine maintenance</td>
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<td>Replacement system in areas with chronic failing septic tanks</td>
<td>Subject to upsets under heavy loads</td>
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<tr>
<td></td>
<td>Less resilient to long periods of no use (starvation)</td>
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<td>Operating permit with annual inspection by CHD required</td>
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<td>Maintenance Contract required</td>
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Performance-Based Treatment Systems (PBTS)

• Permitting Category
• Specialized onsite sewage treatment and disposal system
• In many cases, includes an ATU
• Designed to achieve specific and measurable established performance standards for:
  ✓ Carbonaceous biochemical oxygen demand (CBOD₅), total suspended solids (TSS),
  ✓ TN (total nitrogen), TP (total phosphorus), and
  ✓ Fecal coliforms
Performance-Based Treatment Systems

- Designed by an engineer
- Performance standards can range from baseline (=septic system) to some advanced level including nutrient reduction and disinfection
- Incentives for better standards: Increased lot flows, setback reductions, drainfield size reductions
- Requires
  - Operating Permits
  - Maintenance Contract
  - Monitoring and Sampling
  - CHD Inspection - Annually
Spring Basin Management Action Plan (BMAP) and Priority Focus Areas

BMAP= Basin Management Action Plan for Impaired Waters
Nitrogen-Reducing Treatment System Options

Overall Goal of Nitrogen Removal: ≥65%

Nitrogen-reducing Aerobic Treatment Units
- Certified to meet National Sanitation Foundation (NSF) Standards 40 and 245
- Require operating permit (OP), maintenance entity (ME) and maintenance contract agreement (MCA)

Performance-based Treatment Systems
- Must be designed by Florida Professional Engineer
- Require OP, ME and MCA

In-ground Nitrogen-Reducing Biofilter (INRB) stacked under a conventional drainfield
- No engineer design should be needed unless lot conditions require
- No OP, ME or MCA needed
Don't flush cigarette butts, tampons, condoms or other indigestible materials down the toilets or sinks. These will clog the outlet filter or drain field.

Don't pour grease down the drain -- grease cannot be digested by the septic system and will clog it! Instead, pour the grease into an empty can or bottle and discard with the trash.

Don't use excessive amounts of bleach or other cleaning products -- too much will interfere with the bacterial action inside the septic tank. Small amounts of household bleach or laundry detergent can be used without ill effects.

Don't do several loads of laundry back-to-back -- instead, space your wash loads out over the week so that the septic system does not have to process so much water (a typical wash load uses between 60 - 90 gallons per load!).

Don't plant trees or shrubbery near or over your drainfield. Roots from trees and plants will grow into the drainlines and clog them.

Don't allow vehicles to drive over any part of your septic system. Traffic over your drainfield can crush the pipes or pack down the soil around them, and driving over the septic tank can cause the tank's lid to crack or break apart!
Do conserve water -- the less water you use, the less wastewater your septic system will have to process! Look into installing water-conserving showerheads, toilets or other water-saving features.

Do have your septic tank pumped out periodically. The Florida Department of Health recommends that septic tanks be pumped out every four to five years to reduce accumulations of sludge in the tank.

Do check your plumbing for leaks on a regular basis. A leaking toilet flapper valve can let hundreds of gallons of wasted water into your septic system, causing stoppages and overloaded drainfields.

Do consult your local health department for more information. Our Environmental Health Professionals can provide you with many tips and information to help your septic system last as long as possible.
For more information:

Bureau of Environmental Health
Division of Disease Control and Health Protection
Florida Department of Health

Florida Department of Health in Charlotte County