



Managing the “Other” Advanced Sewage Treatment Systems:

An Assessment of Florida’s Aerobic
Treatment Units and Similar Onsite
Sewage Treatment Systems

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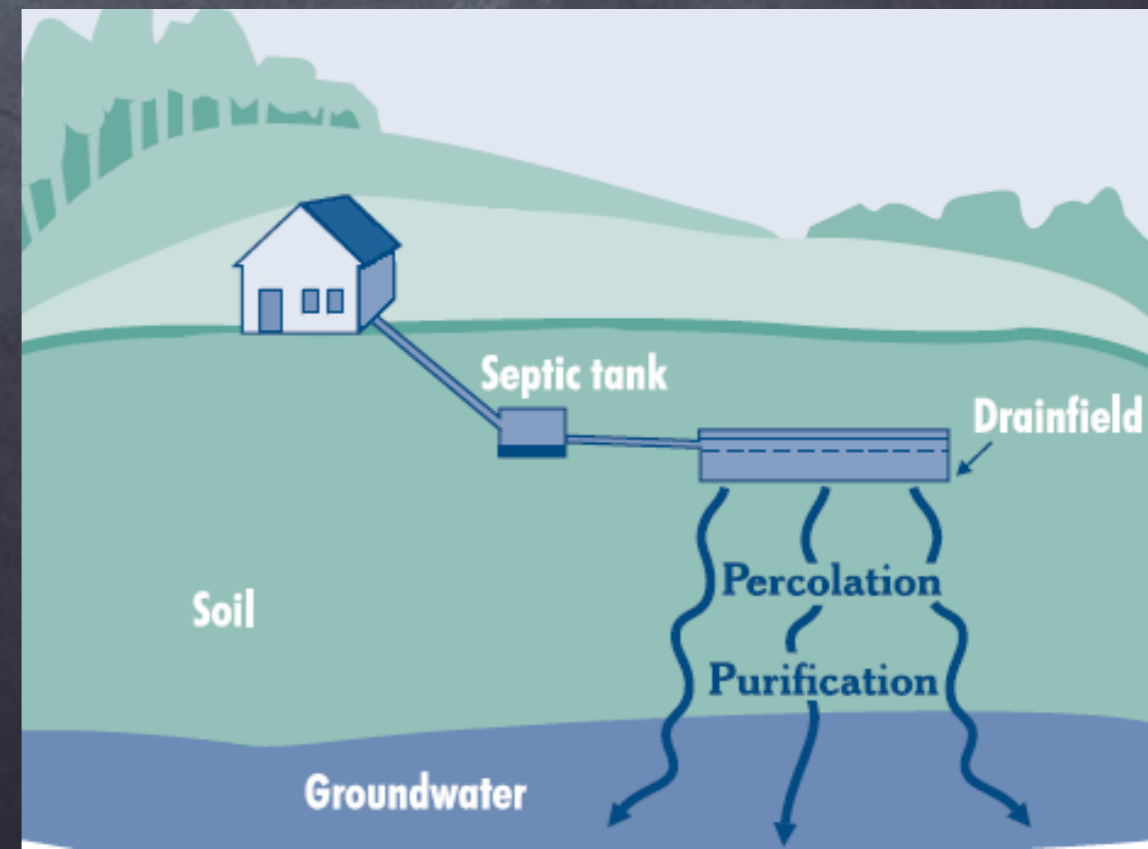
Central sewerage systems



Onsite sewage treatment and disposal systems (OSTDS)

- Collection and treatment (and disposal/reuse) is centralized for many parcels
- Management and ownership of components by Utility

- Treatment and disposal on individual parcels
- Management and ownership by property owner (generally)



“Advanced Systems”

Common term for something better than a septic system

- Aerobic Treatment Units
- Performance-Based Treatment Systems
- Innovative 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

performance-based septic tanks

Aerobic treatment unit

nitrogen-reducing septic systems

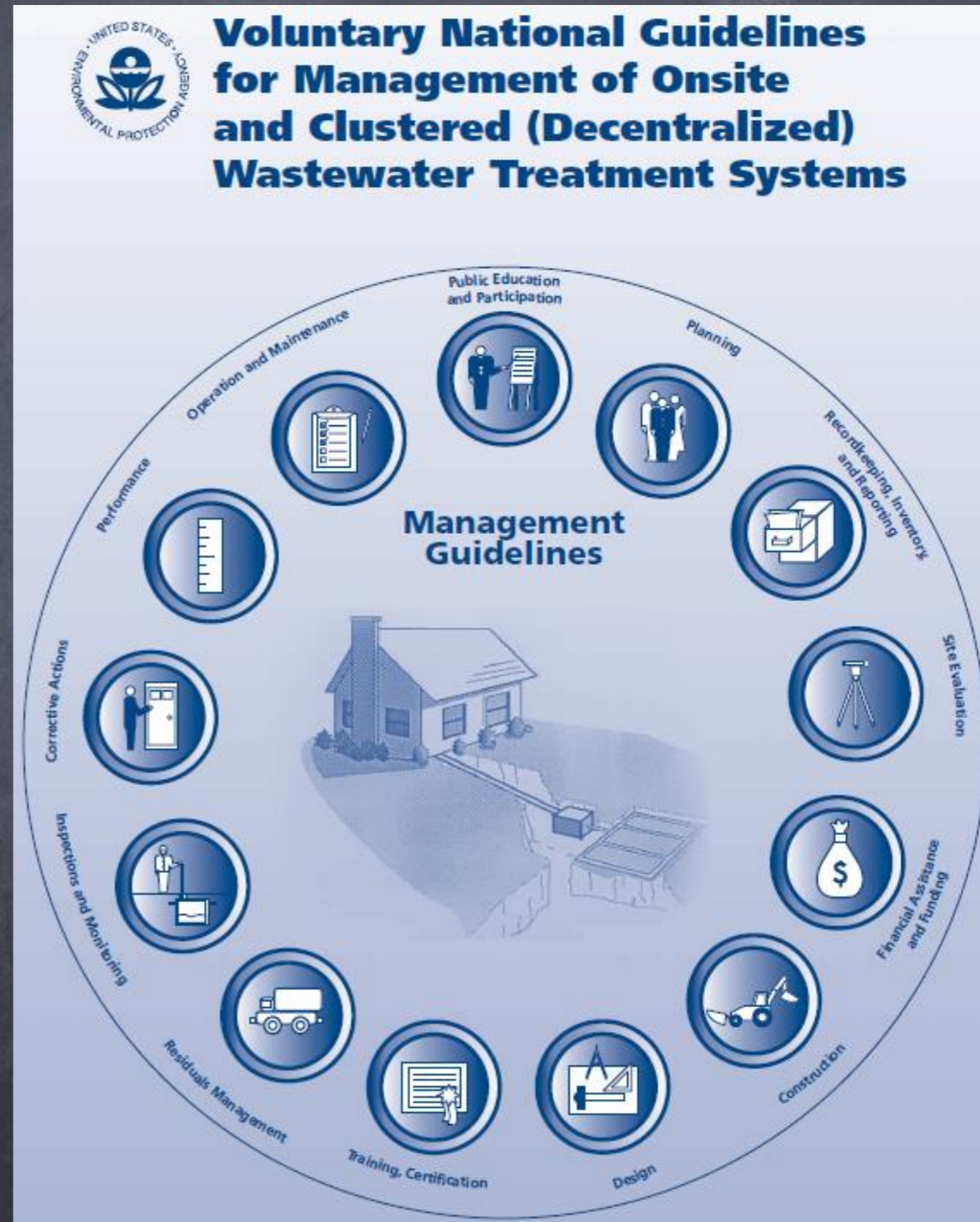
high-performance septic systems

advanced aerobic systems

Levels of Management of OSTDS

Increase the level of management as the levels of risk and technical complexity increase

- 1: Homeowner Awareness
- 2: Maintenance Contracts
- 3: Operating Permits
- 4: Responsible Management Entity (RME) Operation and Maintenance
- 5: RME ownership



Performance and Management of Advanced Onsite Systems



Assess:

- Water quality protection
- Administration of program
- Effective monitoring practices

Tasks:

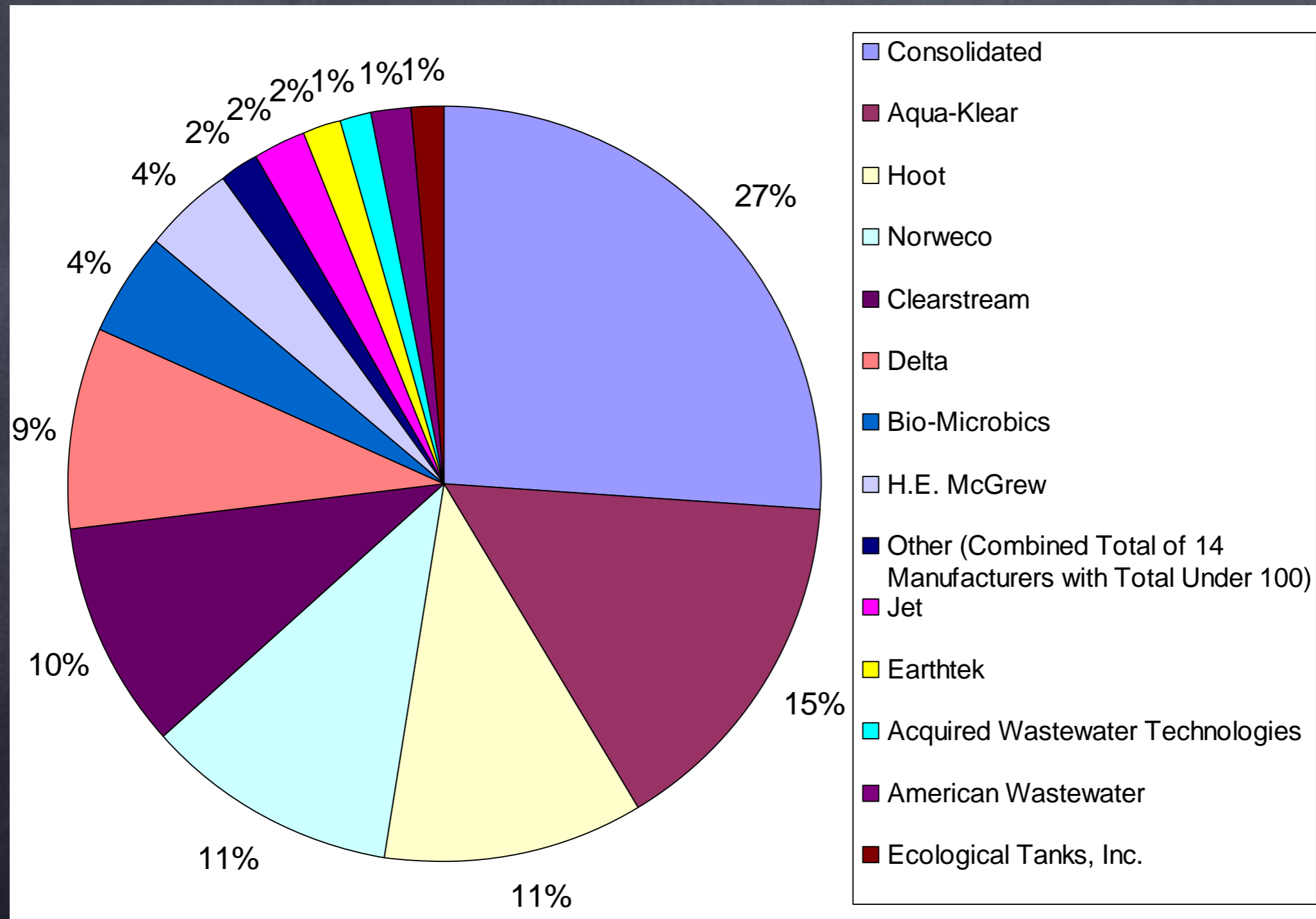


Inventory of Advanced Systems General Statistics

- ~16,600 addresses identified (<1% of OSTDS)
- 60% in Monroe, Charlotte, Brevard, Franklin, or Lee counties
- Most are residential ATUs
- Over half of the systems with a recorded installation date were installed between 2005 and 2008



Database of Advanced Systems Treatment Technology Manufacturers



90% are extended aeration

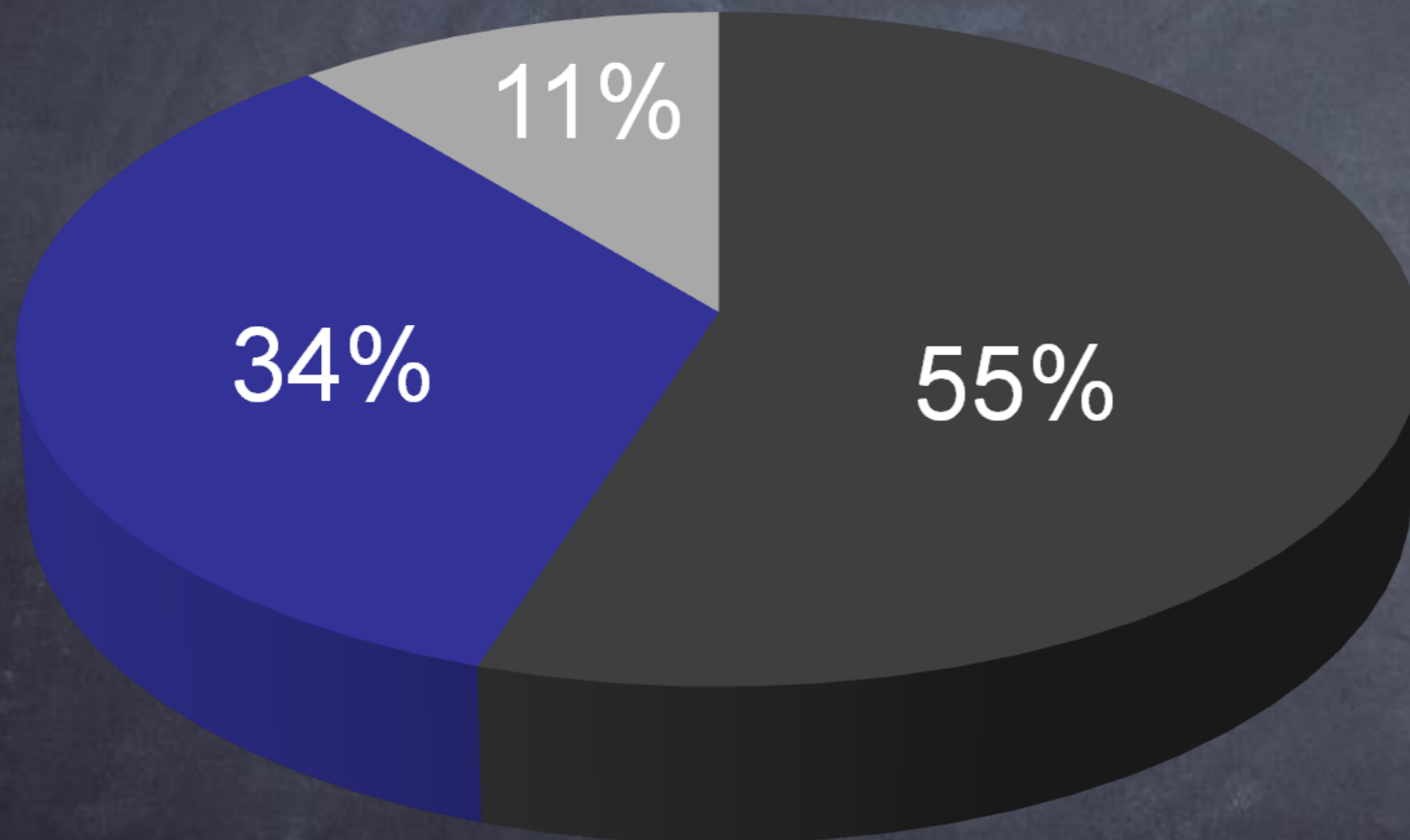
Survey of User Groups

General Statistics

- Owner/Users
 - ~3,800 surveys sent to system users throughout Florida
 - 660 completed surveys were returned
 - Most surveys completed by full-time residents that own the home with the system
 - Most systems served less than 4 people
- Maintenance Entities, Installers, Engineers, Manufacturers
- County Health Departments

Survey of System Users

Analysis of Problems



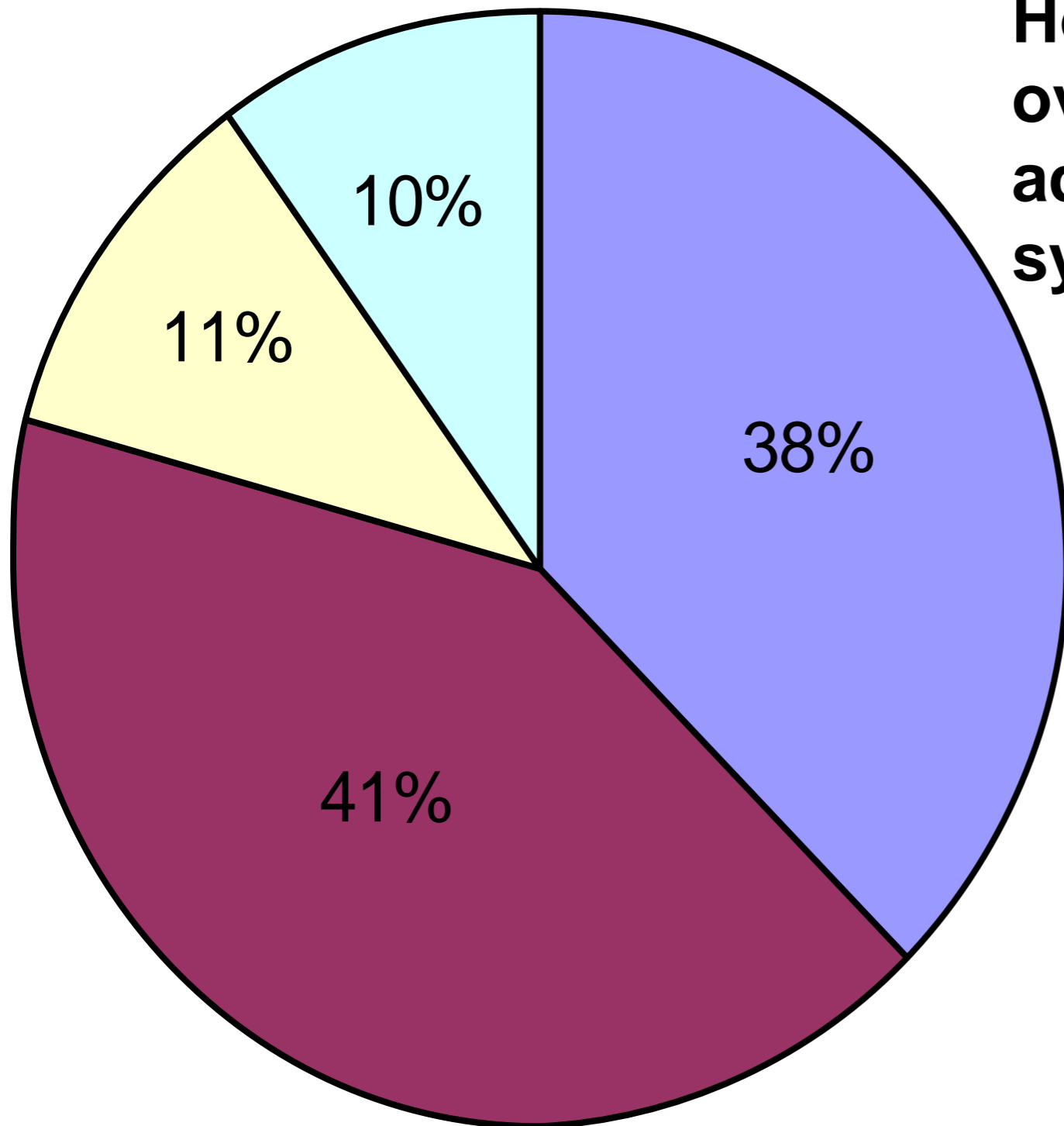
■ No problems
■ 1-2 problems
■ Several problems

Major sources of problems were due to system malfunctions:

- Pump failures
- Electrical malfunctions
- Faulty alarms
- Bad motors

Survey of System Users

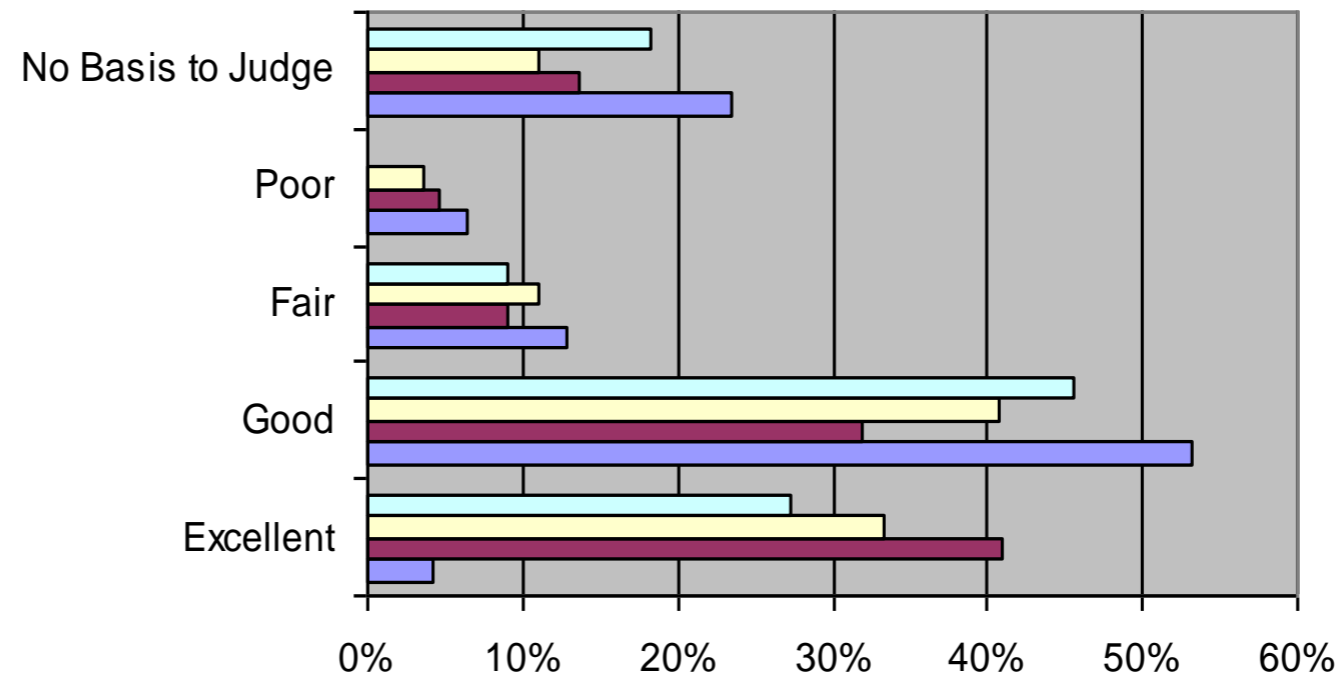
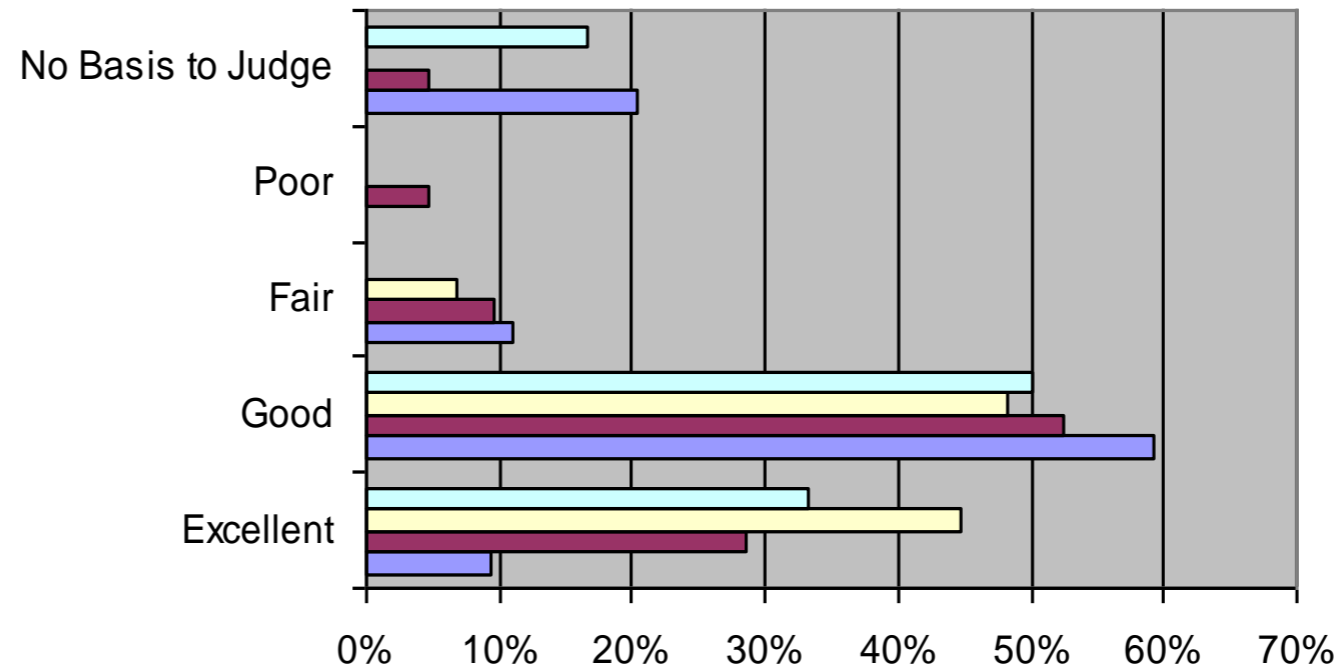
How would you describe your overall satisfaction with your advanced onsite sewage system (septic system)?



- Very satisfied
- Satisfied
- Dissatisfied
- Very Dissatisfied

Survey of Engineers, Maintenance Entities, Installers, and Regulators

How would you rate the **OVERALL TREATMENT PERFORMANCE** of the advanced systems you are involved with?



Statewide Sampling of Systems



Selected 901 systems randomly and 113 systems
based on technology (total 1014)

The following results analyze the RANDOM samples
only

Statewide Sampling of Systems

- Permit file review and site visits:
 - about 30% were not advanced systems
- 469 of 629 advanced systems visited
 - Many vacant houses (~18%)
- Initial System Evaluation (from outside)
- System Operation Evaluation (more detailed look, access interior)
- If accessible and, preferentially, occupied:
Sampled for: cBOD5, TSS, TKN, NOx, TN, TP, and sometimes fecal coliform



The exception!



Initial System Evaluation

- 30% of systems were not operating properly
 - Largely aeration issues:
 - power switched off (15%), power indicator off (24%), aerator not working (22%), no aeration in tank (23%)
 - Some systems with alarm on (5%)
 - Few with current ponding (1%) , missing covers (2%), evidence of breakouts (3%)
- Occupied buildings were less likely to have aeration problems than apparently unoccupied ones

Sampling



Sampling Results

(309 effluent, 42 influent)

Median	cBOD₅ (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)
Influent	95	66	45	7.9
Effluent	5.5	19	30.3	7.5
% Difference	94%	72%	33%	6%
Performance Standard For Adv. Secondary Annual Average	10	10	20	10

Comparison of Median Sample Results Between Aerating and Non-Aerating Systems

Parameter	Influent	Aerating		Non-Aerating	
		Result	% Removal	Result	% Removal
cBOD ₅ (mg/L)	95	4.6	95%	38	60%
TSS (mg/L)	66	18	73%	23	65%
TN (mg/L)	45	29	36%	47	-4%
TKN (mg/L)	45	4.9	89%	42	8%
TP(mg/L)	7.9	7.3	7%	8.7	-10%

Conclusions

- Advanced onsite systems
 - most frequent where regional requirements exist
 - small fraction of all onsite systems
 - predominantly utilizing extended aeration
- Users/owners and stakeholders
 - generally positive
- Site assessments
 - under a third did not operate properly
 - largely due to lack of power or aeration malfunction
 - Issues concentrated in vacant houses

Conclusions

- Influent concentrations
 - vary widely
 - concentrations lower than recent studies
- Median effluent concentrations
 - 90% removal of cBOD5
 - 72% for TSS
 - 33% for TN
 - nothing for TP
 - consistent with employed treatment
- Operational advanced systems
 - significantly better for cBOD5, TKN, and TN

Thank you!



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<http://www.myfloridaeh.com/ostds/research>