

# Characterizing OSSF Wastewater Streams in Texas RV Parks

Texas A&M OSSF  
Research Team

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# Overview

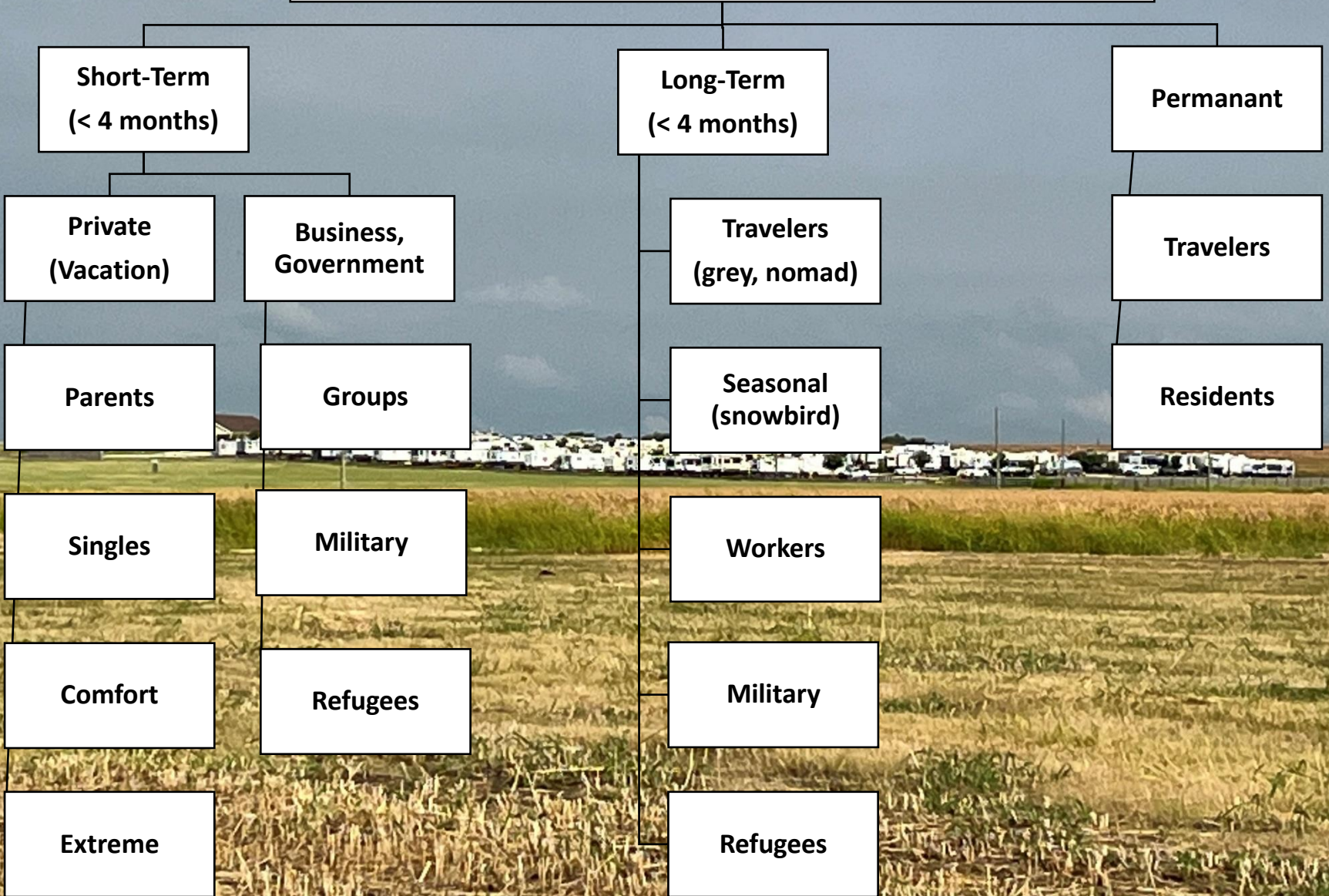
- RV park types and amenities
- RV park patronage and usage
- Waste stream unknowns
- Planned research
- Preliminary results



## Texas Onsite Grant Program - Request for proposals 2021

- The number of RV parks in Texas is increasing
- RV park patronage stay lengths are increasing
- RV park amenities are increasing
- RV park OSSF design challenges, compliance issues, and operational problems are increasing
- There is a lack of real-world data on which to base new OSSF designs, address compliance issues, and better understand function of existing designs

**RV - Camping, Travel, and Temporary Housing Industry Patronage**



## Short Term – Traditional Campground

- Typical state and national park format
- Stays usually limited to < 1 week
- Wilderness areas without many comforts
  - Accommodations usually very basic
    - gravel pad, table, fire pit, etc.
  - Offer varying levels of service
    - Electricity and water hookups
    - Toilet facilities (centralized)
    - RV dump station



Photo from Texas Parks and Wildlife



Photo by Ryan Gerlich

## Short Term - Vacation/Resort Park

- Typically cater to families with children
- Private RVs staying for < 1 week
- Variety of recreational interests
  - Theme park atmosphere
  - Water attractions (i.e., pools, etc.)
- On-site restaurants and/or dining facilities
- RV or cabin (i.e., park model) rentals
- Community center
- Organized activities

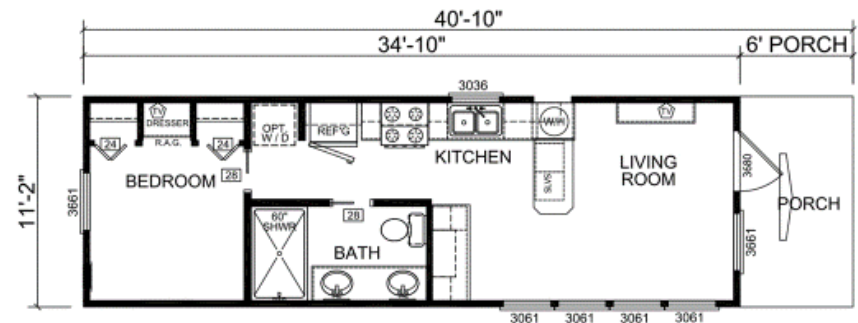


## Short Term - Park Model or "Cabin"

- Stays usually limited to 1-2 weeks
- Chassis with wheels and vehicle tag
- 12' wide, 36' feet long, <400 ft<sup>2</sup>, porch
- Not designed for long-term residence (i.e., insulation, plumbing, etc.)
- Utilize "ultra low flow fixtures"
- No laundry or dishwasher



Typical Floor Plan



MODEL: **APH 536**  
12 x 34 399 Sq.Ft  
1 Bedroom 1 Bathroom



## Long Term – Seasonal Park

- Private RVs staying 3-4 months
- Amenities designed for extended stays
  - Full bathroom facilities
  - Full laundry facilities
  - Clubhouse with warming kitchen
  - Convenience or general store
- Many cater to seasonal “Snowbirds”
- May offer organized events/activities



## Permanent Full-Time Residential Park

- Typically require monthly, or longer, leases
- Most offer full bath and laundry facilities
- Many designed for restricted groups ( e.g., seniors, professionals, etc.)
- Many cater to migrant-type workforces
  - Construction – “Man Camps”
  - Oil/gas industry
  - Military, Nursing
  - Disaster refugees



## Long Term - Tiny Homes in RV parks

- Alternative to traditional home
- Designed for full-time habitation
- Lease RV space by month/year
- Legally classified as RVs
- Must maintain movable status
- Have full size appliances and flows
  - Toilet, sinks, showers, etc.
  - Laundry and dishwasher



## Long Term - Low-Cost Housing

- Privately owned RV, often old
- Not designed for permanent residence (insulation, plumbing)
- Lease RV space by month/year
- Many parks are non-permitted
- Mobile home park conversions
- OSSF accommodations unknown



Photo by Ryan Gerlich



Photo by Serena Brigidi

# RV water usage unknowns:

## Short vs Long Term RV-ers

- Weekend campers vs seasonal travelers vs permanent RV residents
- Public bath facilities, kitchens, and other amenities may be used by the whole community (avoiding personal, on-board RV amenities)

## Wastewater quantity (flow)

- RV occupancy varies greatly ranging from singles to families (i.e., park type)
- Normal dilution water supplied by full showers and laundry limited

## Wastewater quality (concentration)

- People may cook differently depending upon stay length
  - full meal cooking vs take out or convenience meals
- People may launder differently depending upon stay length
  - Private RV vs public park laundry machines

## Overall Project Goal:

Develop understanding of modern RV waste streams

## Methods:

- Document park type and occupancy level
- Conduct 30-day monitoring period
- Record daily flow meter amounts
- Collect 24-hour composite samples
- Sample 5 days per week (20 per 30-day period)
- Measure OSSF Influent and Effluent
  - Quantity (flow rate and volume)
  - Quality (concentration - BOD<sub>5</sub>, TSS)



## Preliminary Results - Monitoring:

- Permanent type RV park
  - System A – 16 RVs only
  - System B – 11 RV and Office
- Office
  - Two full baths - toilets/showers
  - Four full-size washing machines
- Monitoring
  - Flow meters and water samplers



# Preliminary Results

- Monitoring two OSSF systems, same RV park
  - System A - 16 RVs only
  - System B - 11 RVs and office with 2 full bathrooms and 4 machine laundry
- Drip irrigation flow meters read monthly, 12 months
  - System A reflects average monthly RV water usage
  - System B reflects average monthly RV and office water usage
- March through June, much higher amenity usage (baths, laundry)
- Many assumptions, multiple interpretations possible

System	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
A - RVs only	42 100%	47 100%	19 100%	16 100%	14 100%	9 100%	31 100%	23 100%	29 100%	25 100%	38 100%	35 100%	26 100%
B <sub>1</sub> - RVs	457 50%	518 54%	206 28%	181 20%	155 20%	101 13%	348 53%	255 34%	319 62%	275 38%	417 57%	381 52%	301 40%
B <sub>2</sub> - Office	450 50%	435 46%	536 72%	716 80%	625 80%	673 87%	313 47%	506 66%	195 38%	454 62%	310 43%	351 48%	464 60%



# QUESTIONS? and Thank You!

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