

# Keys Monitoring Study Update

Onsite Sewage  
Research Review and Advisory  
Committee  
Meeting 10/18/07

# Florida Keys Onsite Wastewater Nutrient Reduction Systems Demonstration Project (1996-2000)

- Ayres Associates constructed and operated a testing facility in the Florida Keys under contract with DOH and funded by EPA
- Influent TN: range 19.25-62.55 mg/L; average 38.6 mg/L
- Results:
  - AWT effluent standards can be met for CBOD5, TSS and TP
  - TN reductions of >70% are achievable without supplemental carbon addition
- Recommend county-wide utility to share costs and utilize cluster systems, and other management strategies

# Keys Background

- Chapter 99-395 of the Laws of Florida established specific effluent standards for OSTDS in the Florida Keys.
- Keys Standards for onsite wastewater nutrient reduction systems (OWNRS) on a permitted annual average basis:
  - 10 mg/L of carbonaceous biological oxygen demand (CBOD5),
  - 10mg/l of total suspended solids (TSS),
  - 10mg/L of total nitrogen (TN)
  - 1 mg/L of total phosphorous (TP).
- Amended in 2001 to allow for aerobic treatment units without nutrient reduction in areas scheduled to be sewerred by 2010

# Keys onsite system sampling

- Through early 2001, operating permit fees could cover yearly sampling of ATUs and engineer-designed systems during annual County Health Department Inspection
- In 2001, legislature reduced fees
- since then, apparently no sampling

# Sources of Variability

- Diurnal (not significant in ATU samples, but limited data)
- Daily (significant)
- Monthly (significant)
- Sampling location (significant)
- Operation and Maintenance?
- Technology?
- Design?
- Influent?
- Usage patterns?
- Sampling method?

# Keys Monitoring Study

- Objective: characterize performance and develop performance monitoring approach
- Sampling by Monroe County Health Department Staff
- 15 OWNRS systems and 5 interim systems, initially
- criteria:
  - residential system,
  - current maintenance contract,
  - permanent residency in the Keys (homestead exemption).
  - OWNRS system included were those that were volunteered by OWNRS owners that responded to mailings by MCHD sent to all OWNRS systems on record that fulfilled the three criteria (192 out of 326 systems).
  - Interim systems were randomly selected from the total population of interim systems in the Florida Keys using the same inclusion criteria.

# Keys Monitoring Study

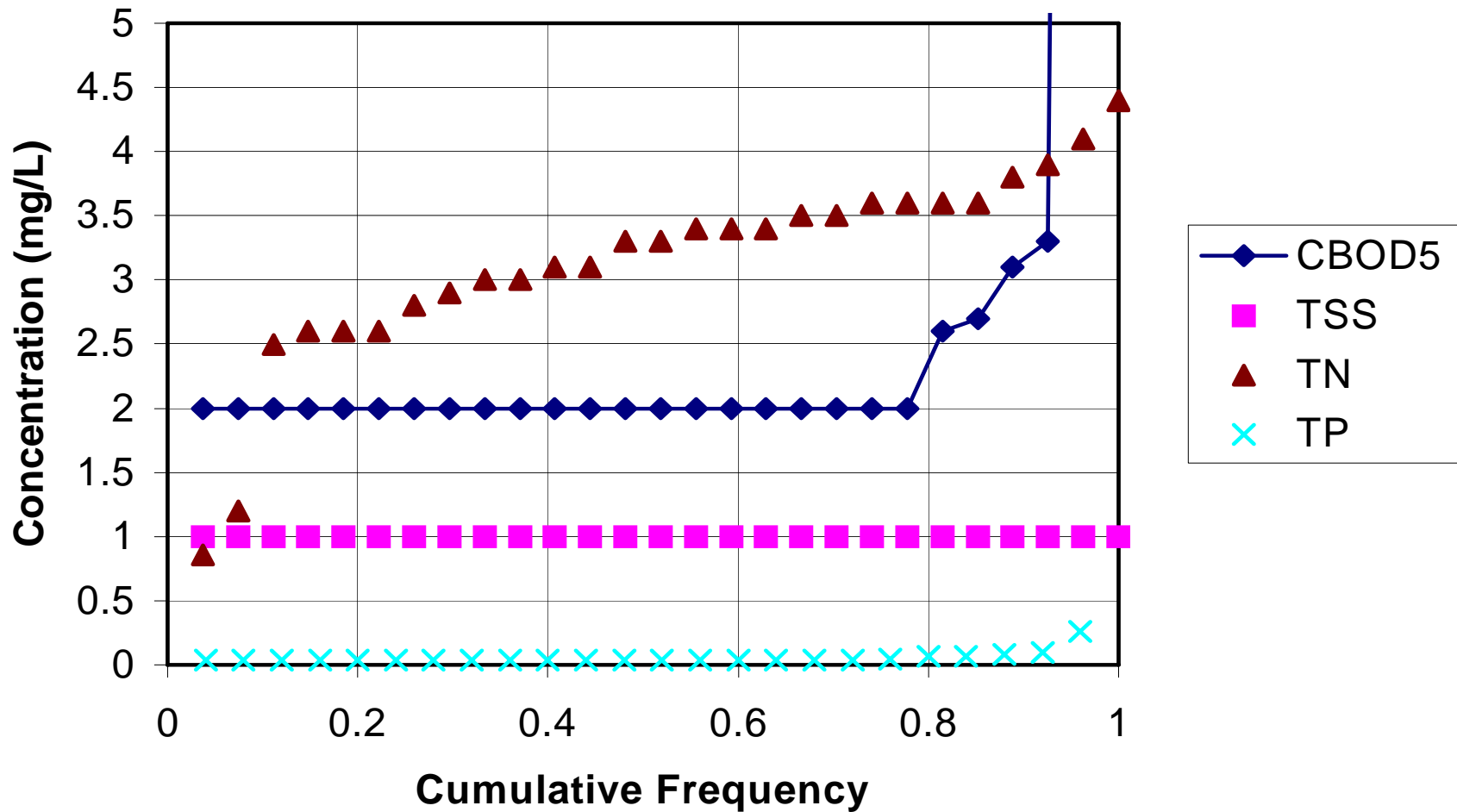
- Sample effluent from P-trap, sample influent where possible from settling tank
- Compare 24-hour time-composite samples to multiple grab samples taken with the same type of equipment
- Each system will be sampled twice during a “peak” season (November through May) and an “off “season (June through October)
- Sampling started 2/18/07, peak season is completed

# Status

- 3 interim systems
- 11 OWNRS
- Some staffing and contracting delays

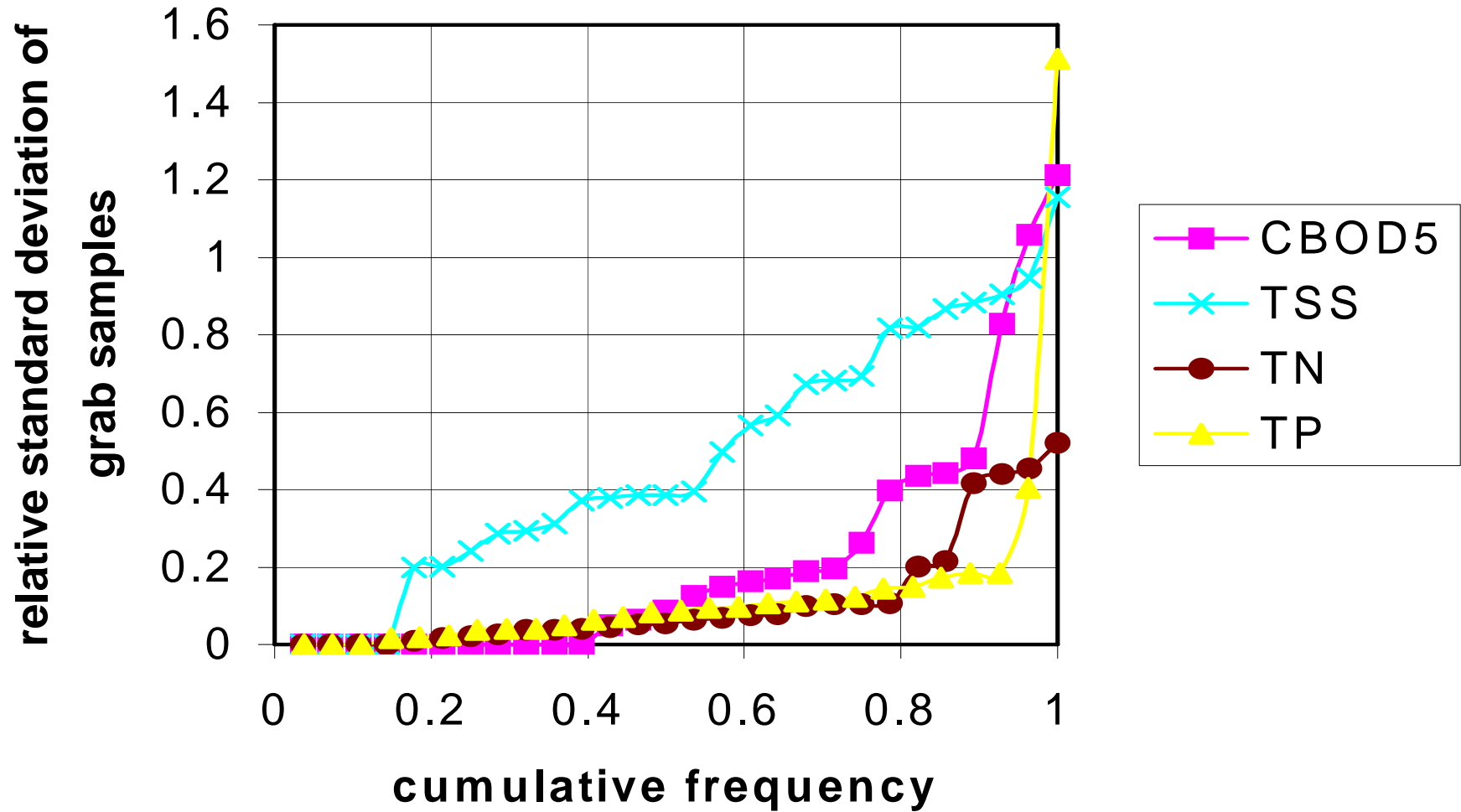
System	Number of Events
Interim 2	2
Interim 4	2
Interim 5	1
OWNRS 1	2
OWNRS 3	2
OWNRS 4	1
OWNRS 5	3
OWNRS 6	2
OWNRS 7	3
OWNRS 8	2
OWNRS 9	2
OWNRS 11	2
OWNRS 14	2
OWNRS 15	2

# Tap Water Results

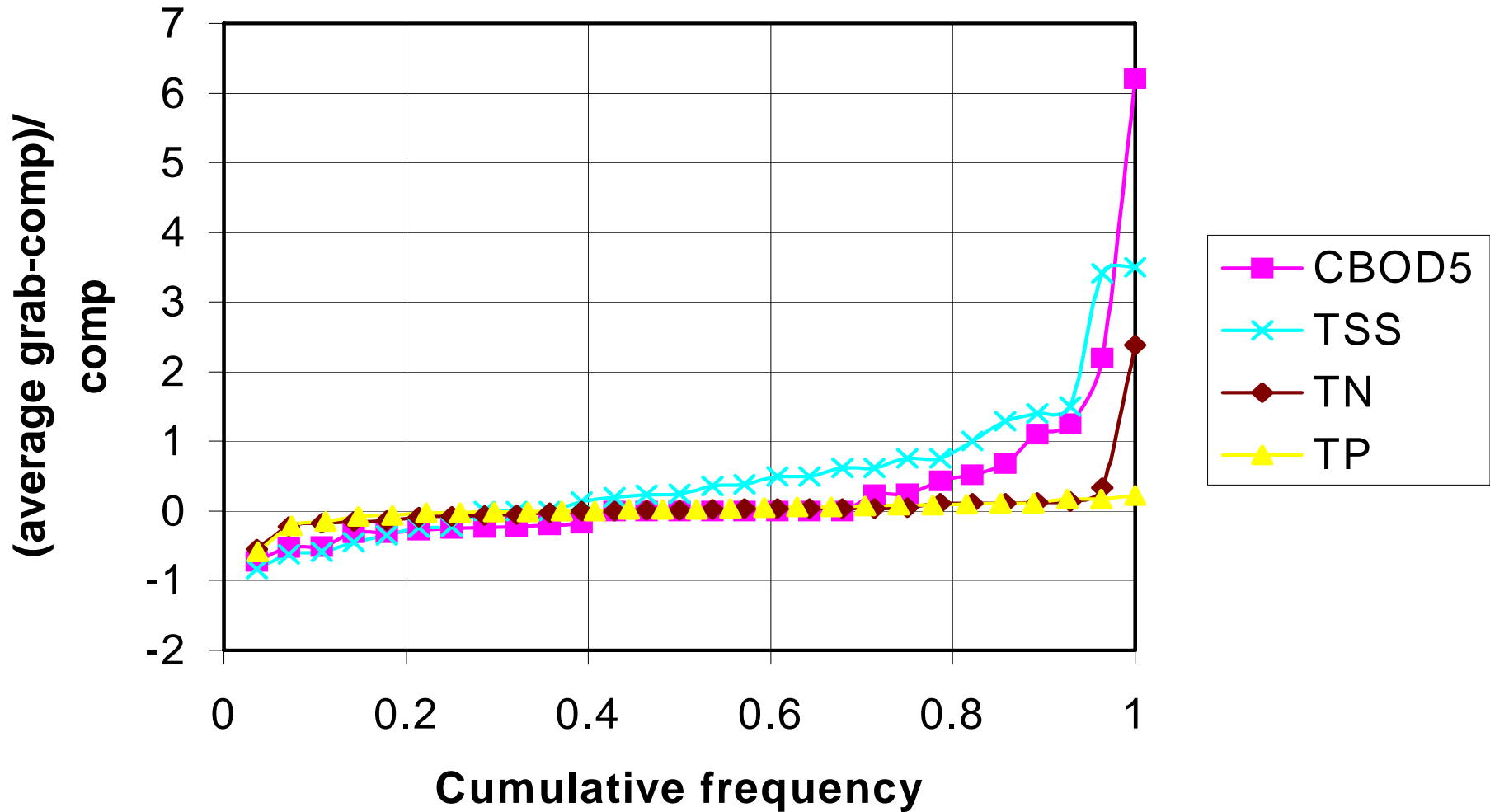


- Note: below detection limit is listed as detection limit value

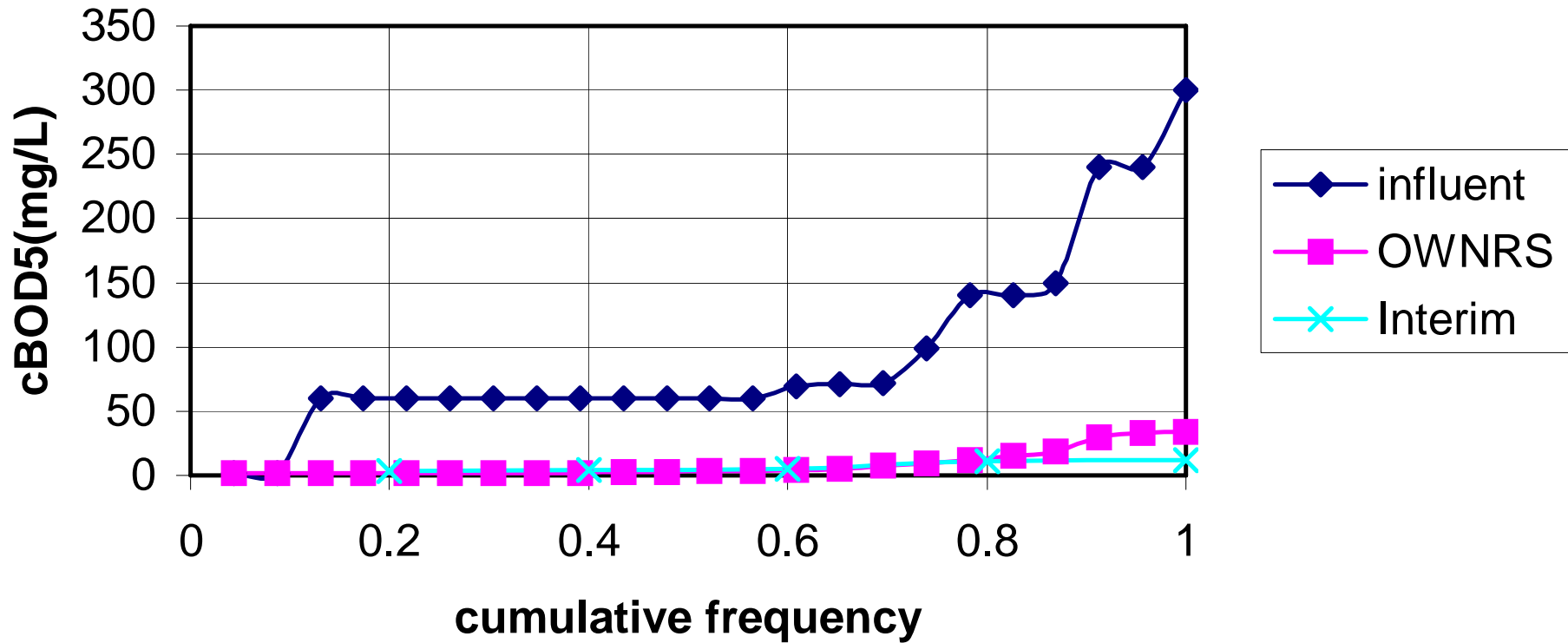
# Variability of Grab Samples in a Day



# Comparison of Grab and Composite Samples

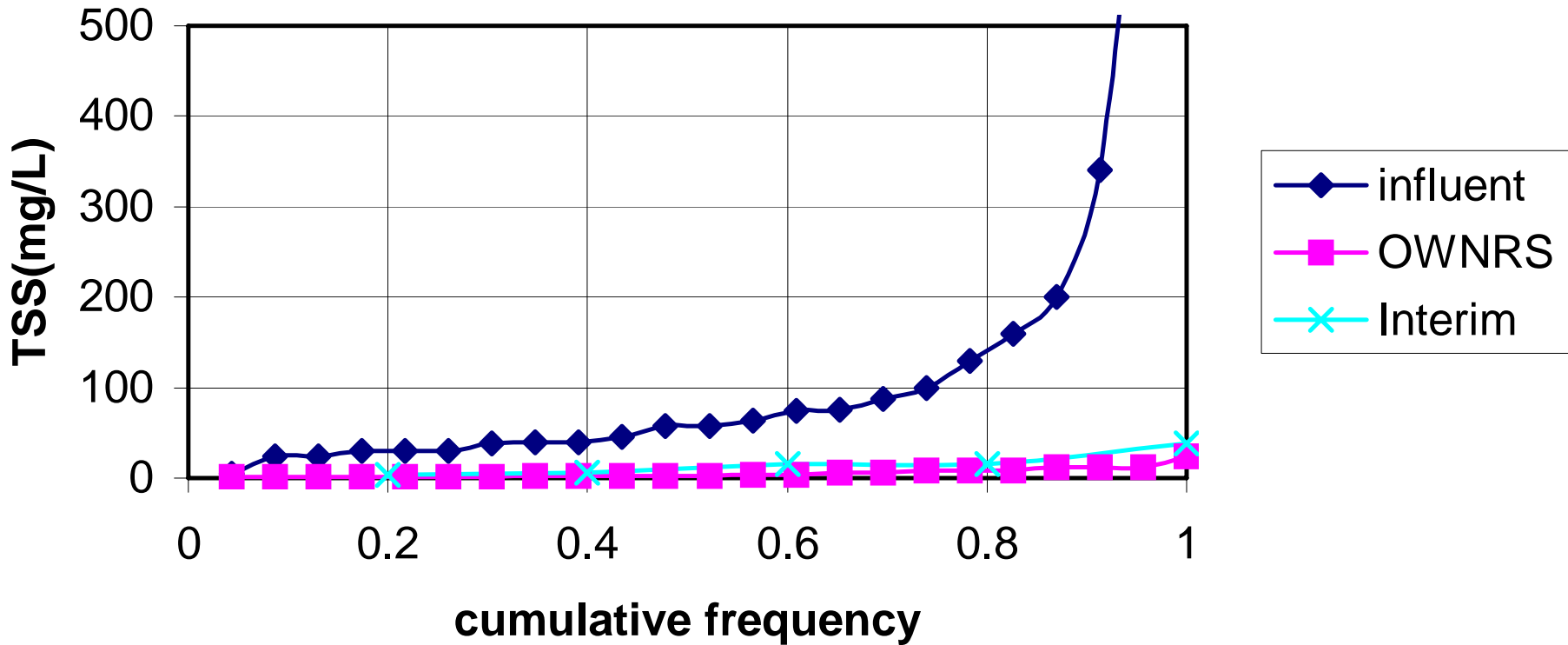


# cBOD5 Influent and Effluent Comparison



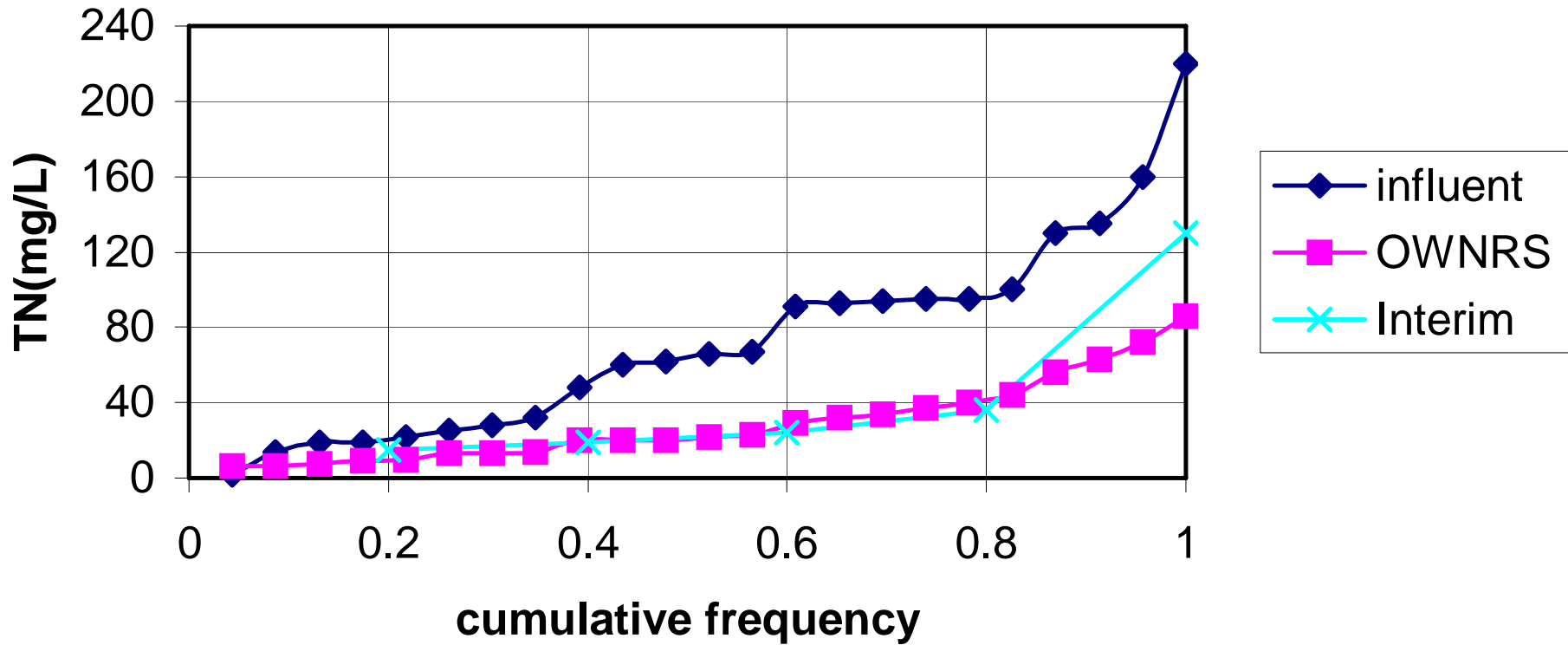
- Note: below detection limit is listed as detection limit value

# TSS Influent and Effluent Comparison



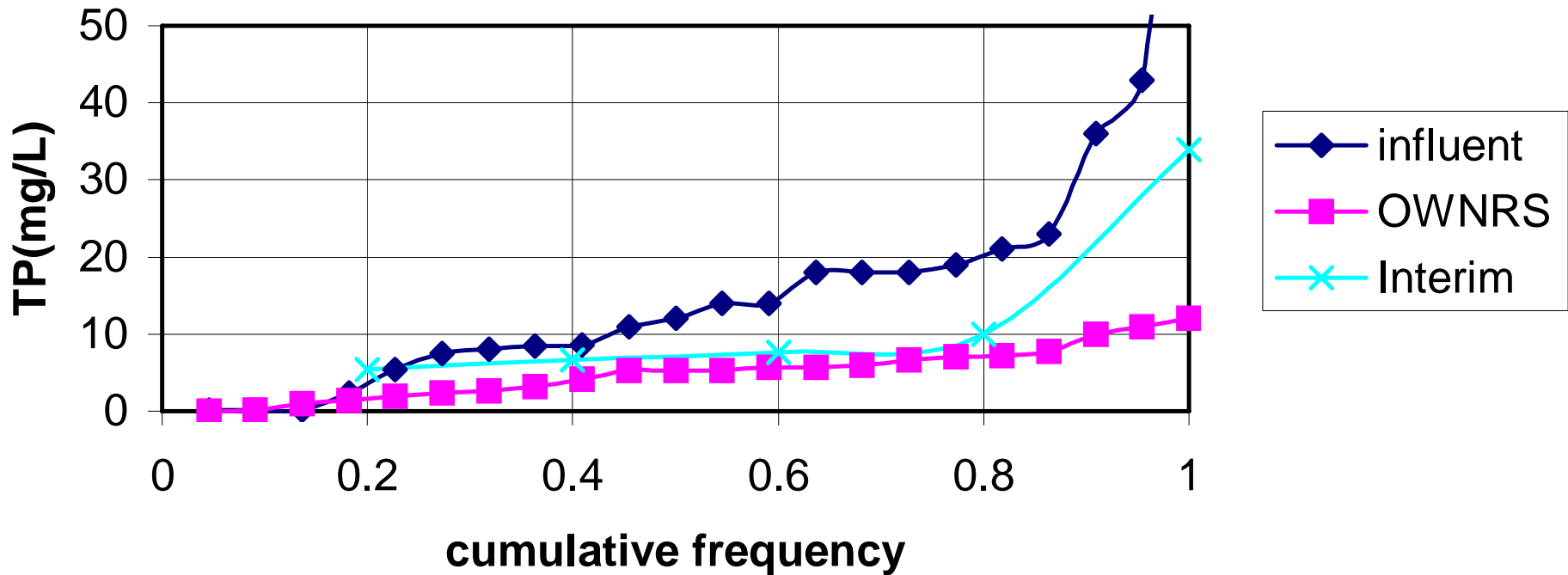
- Note: below detection limit is listed as detection limit value

# Total Nitrogen Influent and Effluent Comparison



- Note: below detection limit is listed as detection limit value

# Total Phosphorus Influent and Effluent Comparison



- Note: below detection limit is listed as detection limit value

# Preliminary Observations

- Only a few odd numbers
- Diurnal variability appears lower for nutrients than for effluent strength
- Nutrient grab samples appear very consistent with time-composite samples, less so for TSS
- Wastewater strength appears to be lower than in Keys OWNRS study
- Nutrient concentrations appear to be higher than in Keys OWNRS study

# Off-Peak Season

- Repeat sampling to assess variability for the same system over time
- Added parameters:
  - Fecal coliform
  - Alkalinity and pH