Alachua County Water Quality Monitoring Program

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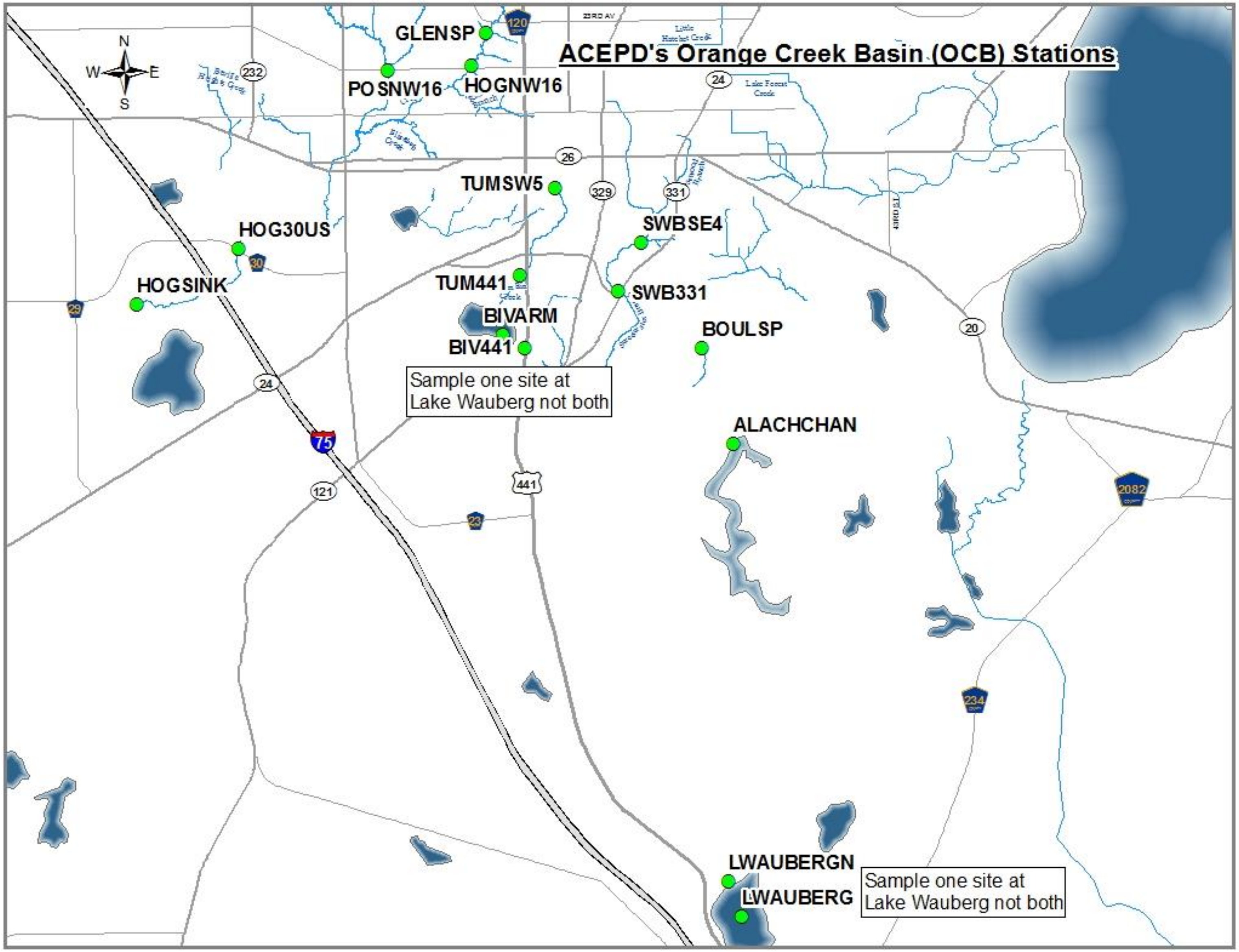
Water Resources Division

- Water conservation
- Water quality monitoring
  - Surface water, groundwater
- Complaint response
- Stormwater improvements
- Wastewater treatment plant inspections
- Educational outreach

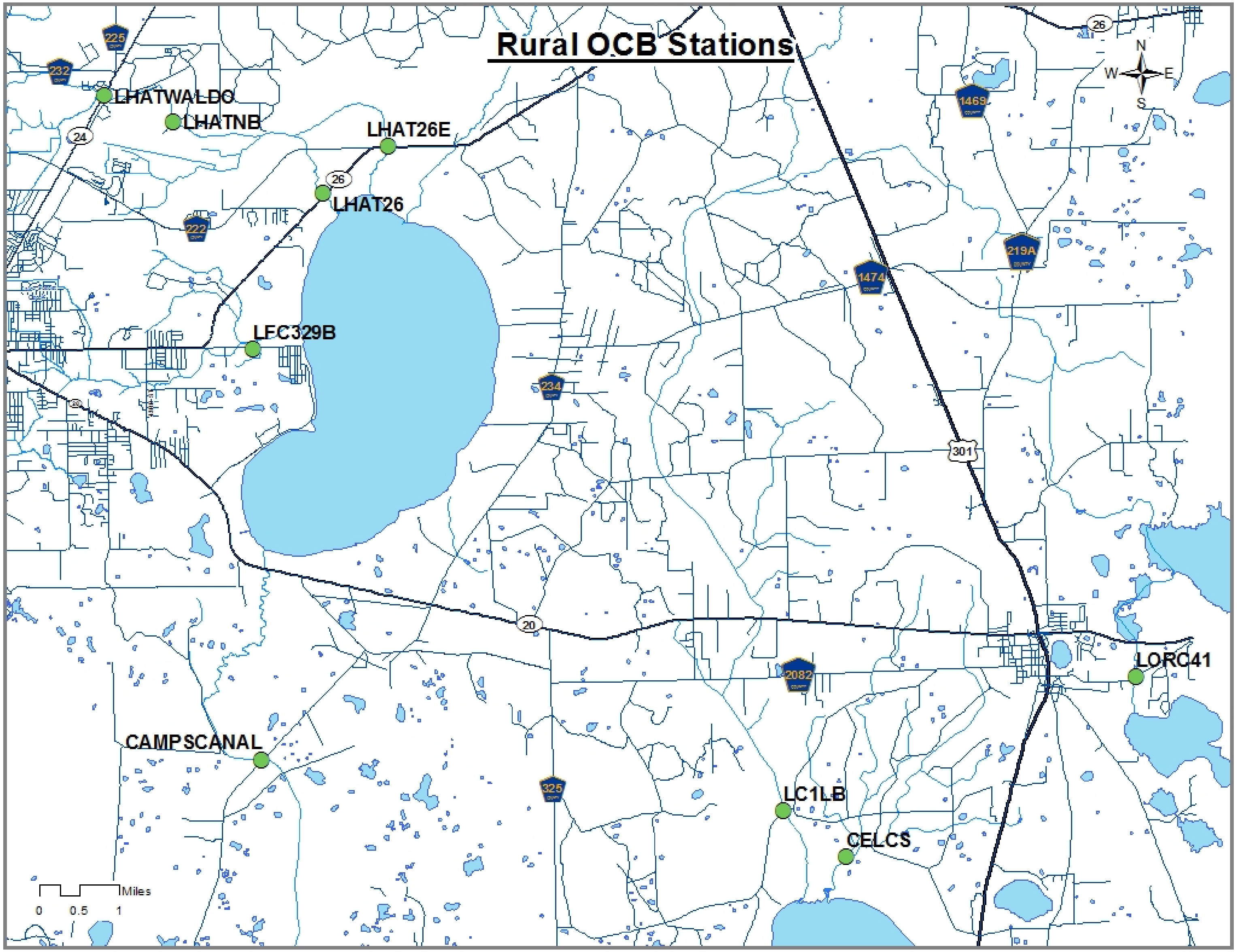
Water Quality Monitoring

- Groundwater
- Surface water
  - Santa Fe River Basin (SRB)
  - Orange Creek Basin (OCB)
  - Lakes
- Special projects
  - Newnan's Lake Improvement Initiative
  - Microbial Source Tracking (MST)

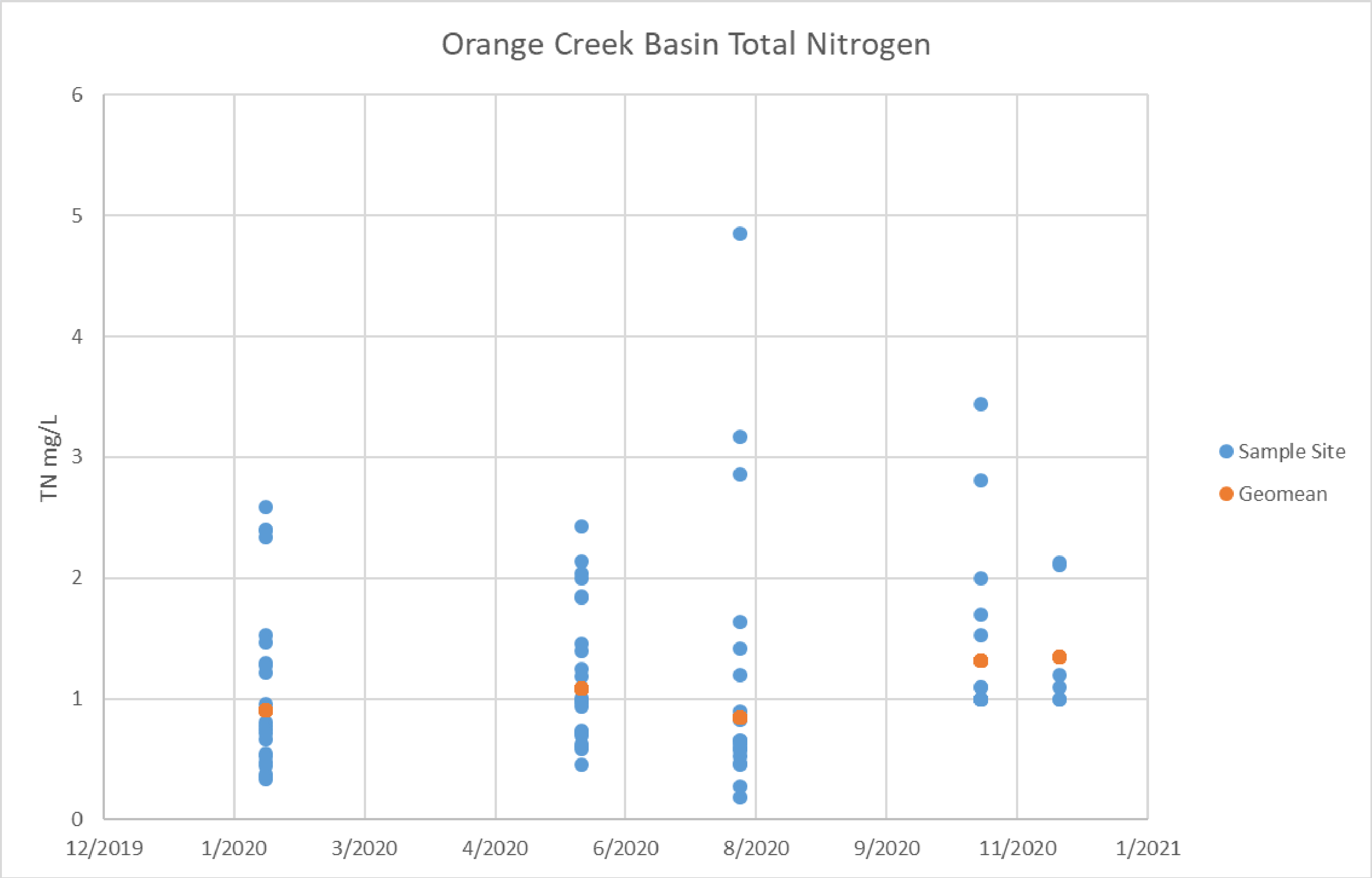
Orange Creek Basin – Urban Sites



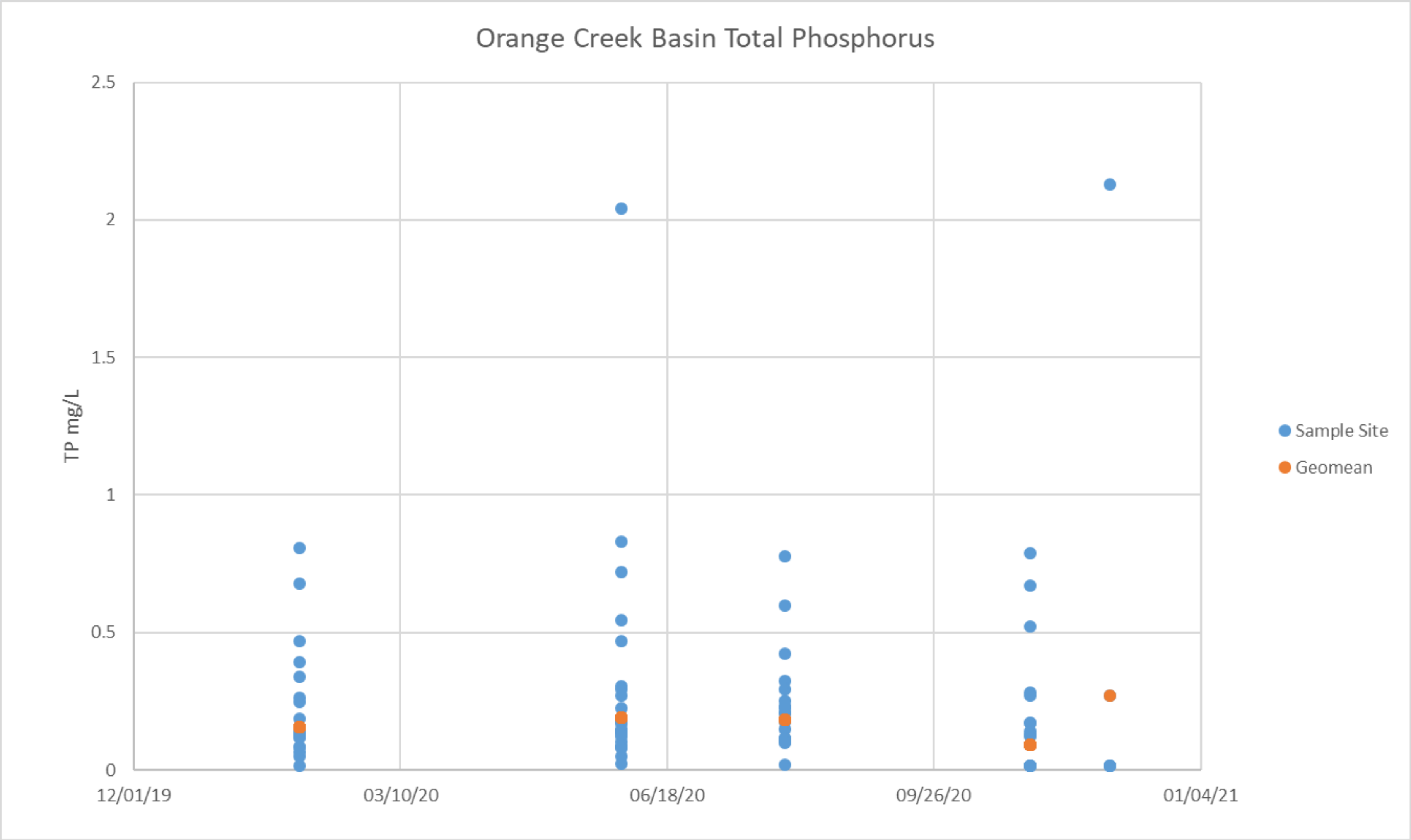
Orange Creek Basin – Rural Sites



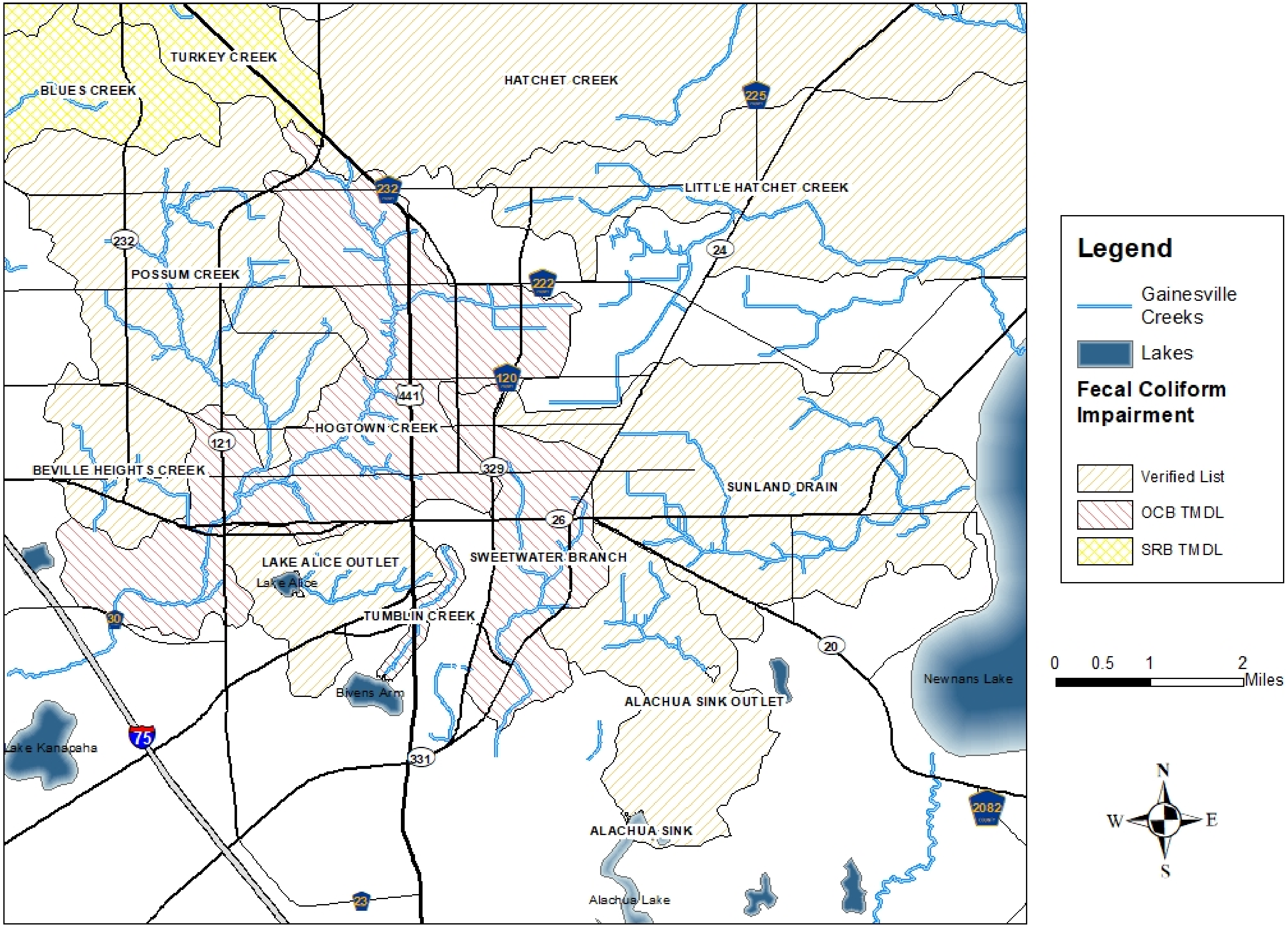
2020 OCB – Total Nitrogen



2020 OCB – Total Phosphorus

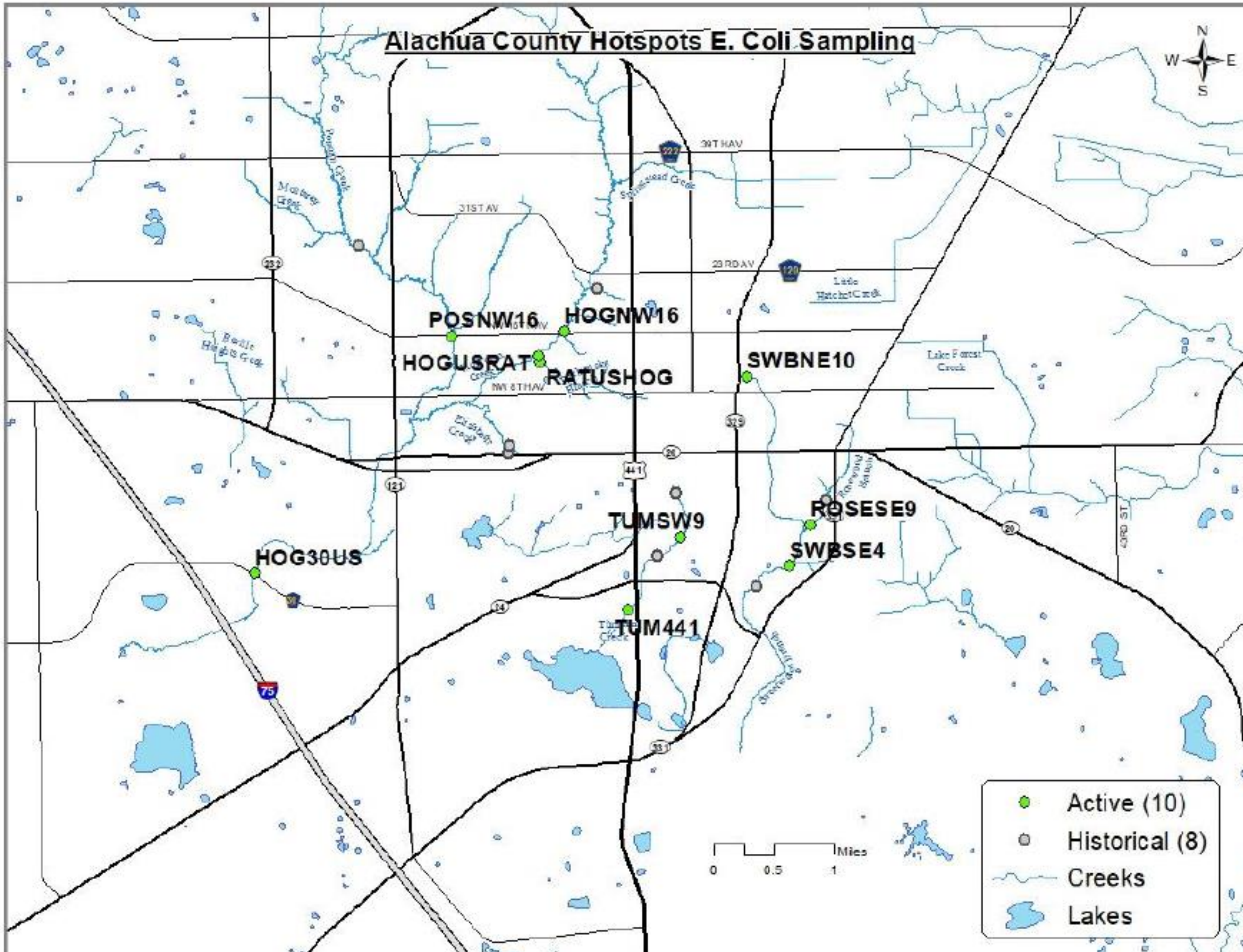


Fecal Coliform Impairments by Watershed for Gainesville Urban Areas



2020 Hotspots Sampling

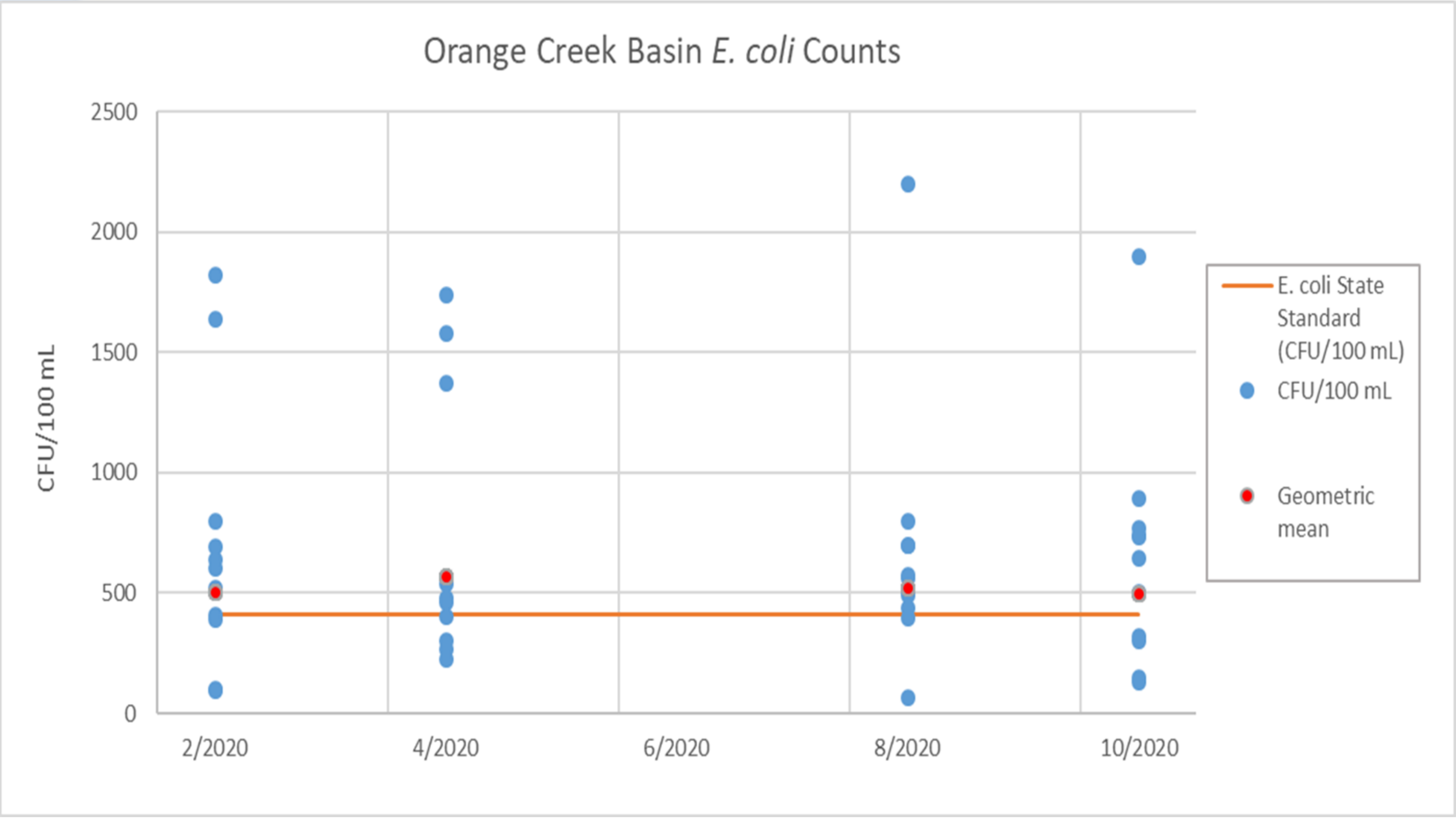
- 10 *E. coli* sites
- Snapshot with spatial resolution
- EPA Lab Method 1603, Membrane Filter
- High E. *coli* results trigger a resampling event (1,000 CFU/100 mL)



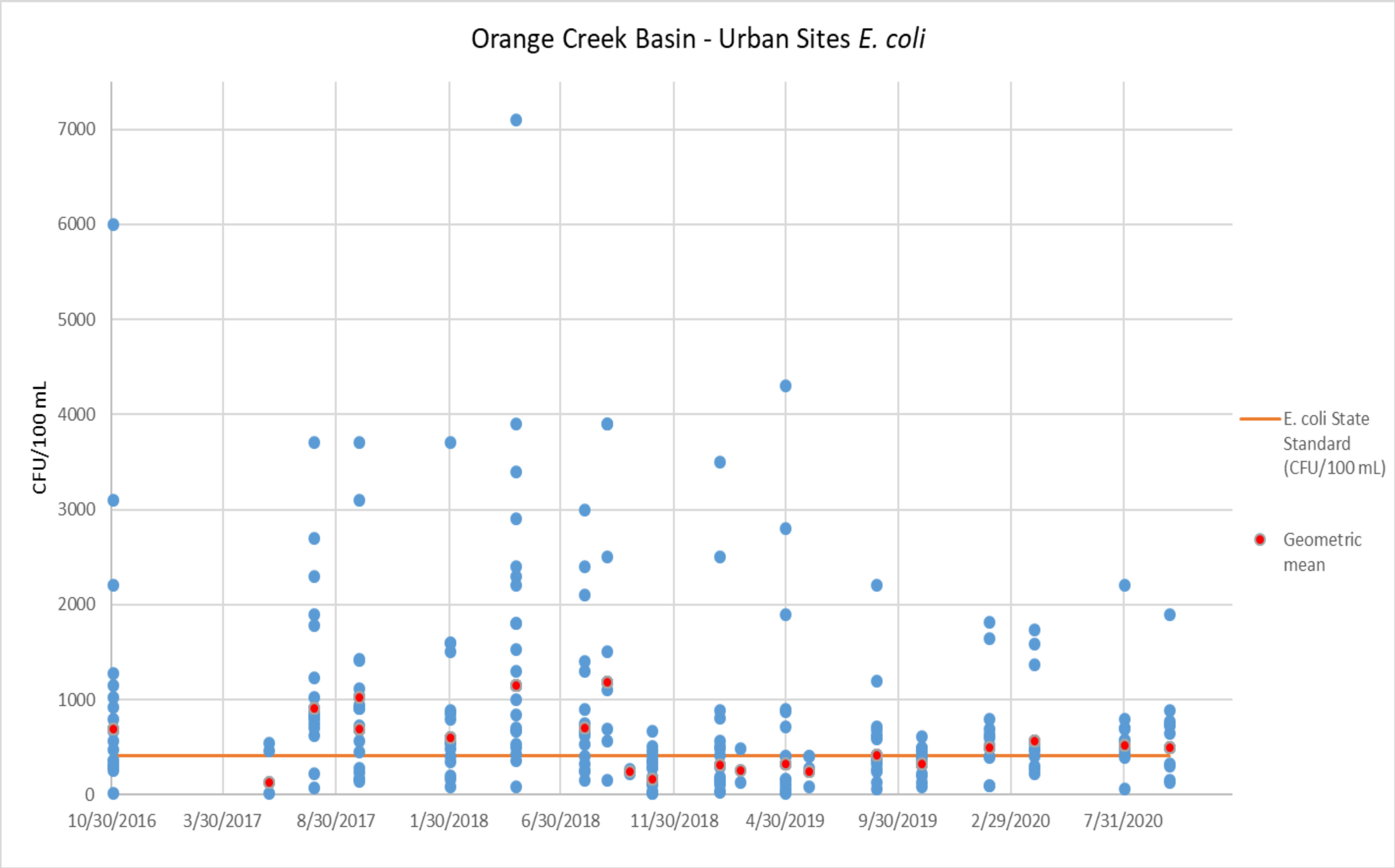
Hotspots *E. coli* results 2020

Watershed	Number of Samples	E. coli Range (Col/100mL)*
Tumblin Creek	8	460 - 2200
Sweetwater Branch (main stem)	8	66 - 1370
Hogtown Creek (main stem)	12	98 - 740
Possum Creek	4	390 - 575
Rosewood Branch	4	267 - 890
Rattlesnake Branch	4	299 - 800
Beville Creek	0	---
Elizabeth Creek	0	---
Lake Forest Creek	0	---

2020 Hotspots Sampling



2016 – 2020 Hotspots Sampling

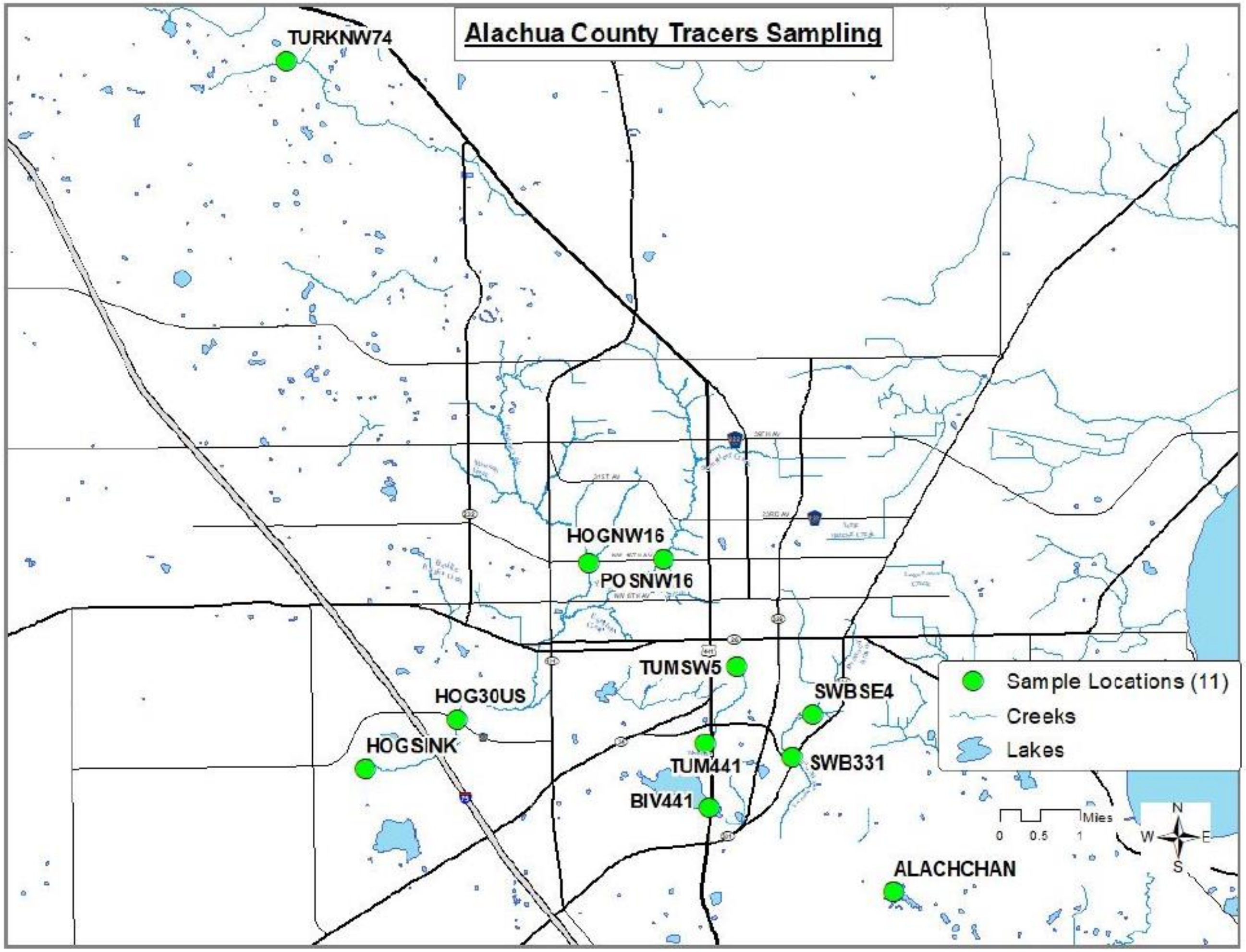


Microbial Source Tracking & Tracers

- Partnered with FDEP for MST and DNA markers
- Evaluate for potential human waste
- Decision tree based for DNA markers
- Sucralose (Splenda), acetaminophen (Tylenol), and other chemical tracers (pharmaceutical, pesticides, and herbicides)

MST Sampling Locations

- 2018-2019
  - 11 sites
  - 20 sampling events
  - 80 compounds
- Imazapyr and Sucralose was detected at all the urban locations
- Other herbicides and pesticides were commonly found at low levels (tenths to thousandths of micrograms)

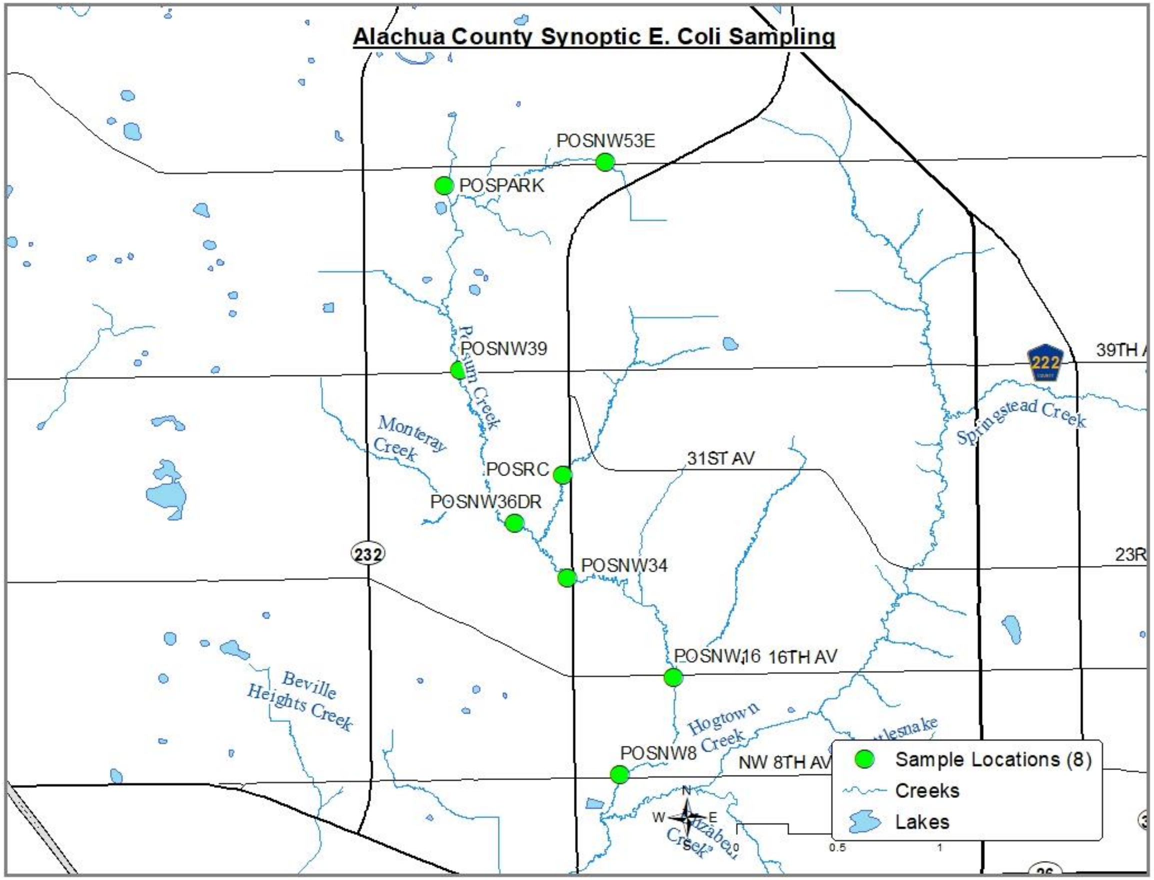


MST Results Continued

- Human Source Marker above threshold:
  - HOGNW16, HOG30US, POSNW16, and SWBSE4 in March and June of 2018
  - POSNW16 in Nov 2018
  - TUMSW5 in Nov 2019 (raw sewage)
- Sources may include pet waste, wildlife, septic tanks, wastewater spills, and homeless camps
- Investigated further through synoptic *E. coli* sampling

2019 Possum Creek Synoptic Sampling

- Potential sources inferred from the spatial distribution of samples
- Eliminate temporal variability in distribution
- Sampling occurred under different hydrologic conditions
- Results:
    - Dry: 78 - 450 CFU/100mL
    - Rainy: 120 – 720 CFU/100 mg/L



Synoptic Sampling

- Targeted sampling with spatial variation
  - Tumblin Creek
  - Sweetwater Branch
  - Rosewood Branch

Outfall Reconnaissance Inventory (ORI)

- Inventory outfalls during dry periods for pollution potential in various creeks
  - Little Hatchet Creek
  - Possum Creek
  - Rosewood

Next Steps

- 2021 sampling public access park locations
  - Alfred Ring Park, Duckpond, Sweetwater Park, Loblolly Woods Park, Oakview Park, Cora P. Roberson Park
- Continue ORI's and synoptic sampling, resample if required
- Comparing methods for bacteria
- Leaching study looking at various residential landscaping practices
- Monitoring efficacy of Little Hatchet bioreactive weirs
- Survey of nutrient sources and potential projects to reduce nutrient loading to Lochloosa Lake

Alachua County Environmental Protection

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Analytical Method	Tracer Type	Chemical Tracer Description
FDEP SOP – PCR-1.0	Biological	HF 183-qPCR - Detection and quantification of human-specific HF 183 Bacteroides genetic marker with quantitative polymerase chain reaction
FDEP SOP – PRC-1.2	Biological	GULL2-qPCR - Detection and quantification of coastal bird specific Catellicoccus marimammalium Gull2 genetic marker with quantitative polymerase chain reaction
FDEP SOP – PCR-1.3	Biological	GFDS-purified-qPCR – Detection and quantification of bird specific Helicobacter GFD genetic marker with quantitative polymerase chain reaction
FDEP SOP – PCR 1.4	Biological	BacR-qPCR – Detection and quantification of Ruminant specific Bacteroides BacR genetic marker with quantitative polymerase chain reaction
FDEP SOP – PCR-4.0	Biological	HF 183 – Human Source Marker BacR-qPCR - Preparation of samples by filtration and held for qPCR analysis
EPA 8321 B	Chemical	Sucralose (Splenda – artificial sweetener); Acetaminophen (Tylenol, over- the counter analgesic); Carbamazepine (antiepileptic drug); hydrocodone (semisynthetic opioid drug); Diuron (herbicide); Fenuron (herbicide); Fluridone (aquatic herbicide); Imidacloprid (neonicotinoid insecticide); Linuron (herbicide); Primidone (anticonvulsant drug); 2,4-D (2,4-Dichlorophenoxyacetic acid, herbicide); Bentazon (herbicide); MCPP (methylchlorophenoxypropionic acid, herbicide); Triclopyr (broadleaf herbicide and fungicide); Imazapyr (non-selective herbicide); and Pyraclostrobin (broad spectrum foliar fungicide)