

# LOCATING AND MONITORING PRIVATE DOMESTIC WELLS TO IMPROVE PUBLIC HEALTH

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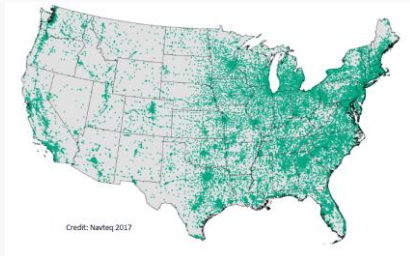


## Overview

- Potential Impacts from Leaking Underground Storage Tanks (USTs)
- Private Well Data Sources
- Pilot Study Locating Wells
- Co-location of USTs and private domestic wells
- Citizen Science



## U.S. Gas Stations



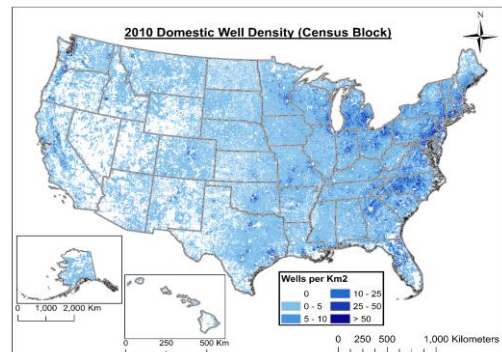
## Alternatives for Locating Private Water Wells

- Negative inference
  - Where are there no water mains/water customers?
    - Large number of purveyors (e.g. 747 in Oklahoma)
- County Health Departments
- County assessor records
  - e.g. 77 counties in Oklahoma
- American Community Survey question on cost of water/sewer
- Long form 1990 Census
  - Public water system vs. private well
  - Project forward in time with state well data and/or census housing data



## Private Wells

- Not regulated by the Safe Drinking Water Act
- Water quality testing not mandated
- Many documented incidents of consumption of contaminated water
- Well owner responsibility
  - Understand potential sources of contamination
  - Conduct testing of the well
  - Develop and implement strategy to clean up well

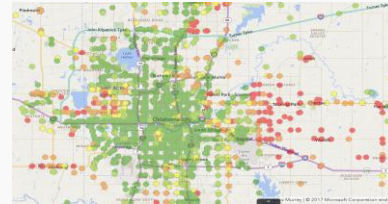




- Locations of high reliance on private wells:  
Rural areas without rural public water
  - Exurbs, Expanding Satellite Cities
    - Territories expanding ahead of water mains
  - Un-annexed and unincorporated areas
  - Enclaves within cities
- Results best viewed as guide to areas of high private well usage
- Co-location of tank sites with private wells indicates areas with elevated potential for impact



## Local Assessment of Impact to Private Wells from Tanks



Circles = 1,500 ft radius around tank site  
Colored by potential for private wells (green-low, red high)<sup>8</sup>



## Citizen Science Role in Monitoring Private Wells

- Monitor parameters of concern in private wells using lower cost approaches
- Assess given wells in addition to wells in a watershed
- Input into geospatial platform to assess potential patterns of contamination and address sources
- Develop recommendations to limit well contamination



## Benefits of Citizen Science in Monitoring Private Wells

- Provide temporal and spatial data on localized and watershed-level impacts to private wells
- Data will not only assist homeowners in protecting their drinking water but also provide key data to local, state, and federal agencies
- This can be key in improving watershed management and public health
  - Important under normal conditions but especially critical in extreme weather events



## Recent Example from Harvey Impact on Private Wells in Houston

- “Well water is at risk for being contaminated, and the well owner is really the one who is responsible. In the City of Houston, we have folks that use well water but we strongly recommend against it — and this will sound awful — we don’t take responsibility for it.”
  - Houston Director of Emergency Medical Services
- Louisiana State University estimated that hundreds of thousands of people across the 38 Texas counties affected by Hurricane Harvey use private wells - those impacted must fend for themselves



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Weaver, Murray, Kremer, 2017, Estimation of the proximity of private domestic wells to underground storage tanks: Oklahoma pilot study. Science of the Total Environment, 31;609:1589-1599.