

Hot Water Use: Implications for Tankless Water Heaters

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Project Outline

- Study hot water draw patterns in single-family residences
- Data from a number of recent studies
 - Monitored hot water use in single-family residences
 - At time resolutions of 1 minute or less.
- Work in progress

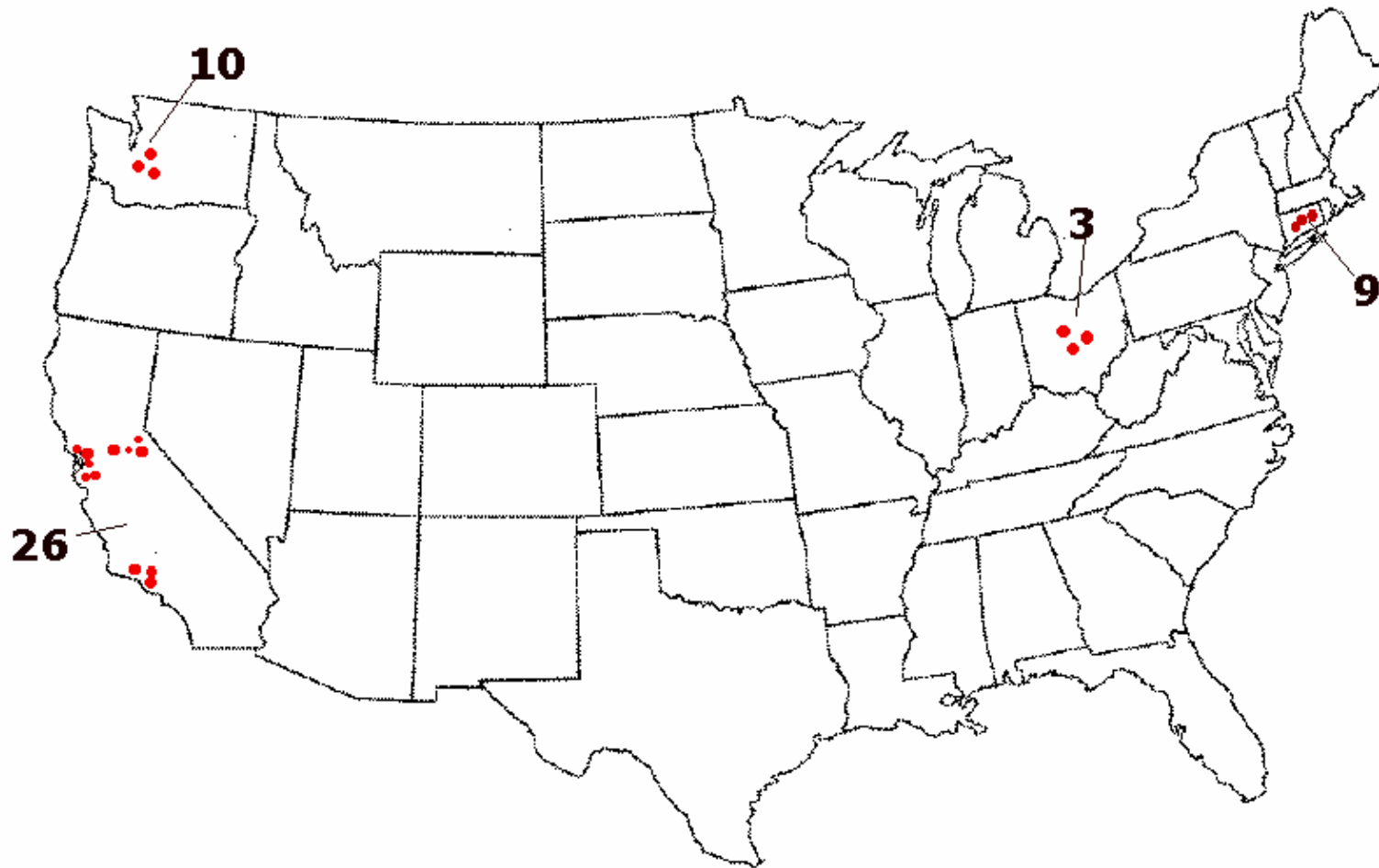
Hot Water Draw Pattern Database

- # studies used = 6
- # monitored houses = 48
- # monitored days = 7,627
- # draws in database = 373,272
- # measured intervals = 1,306,638
- continuing to expand & refine

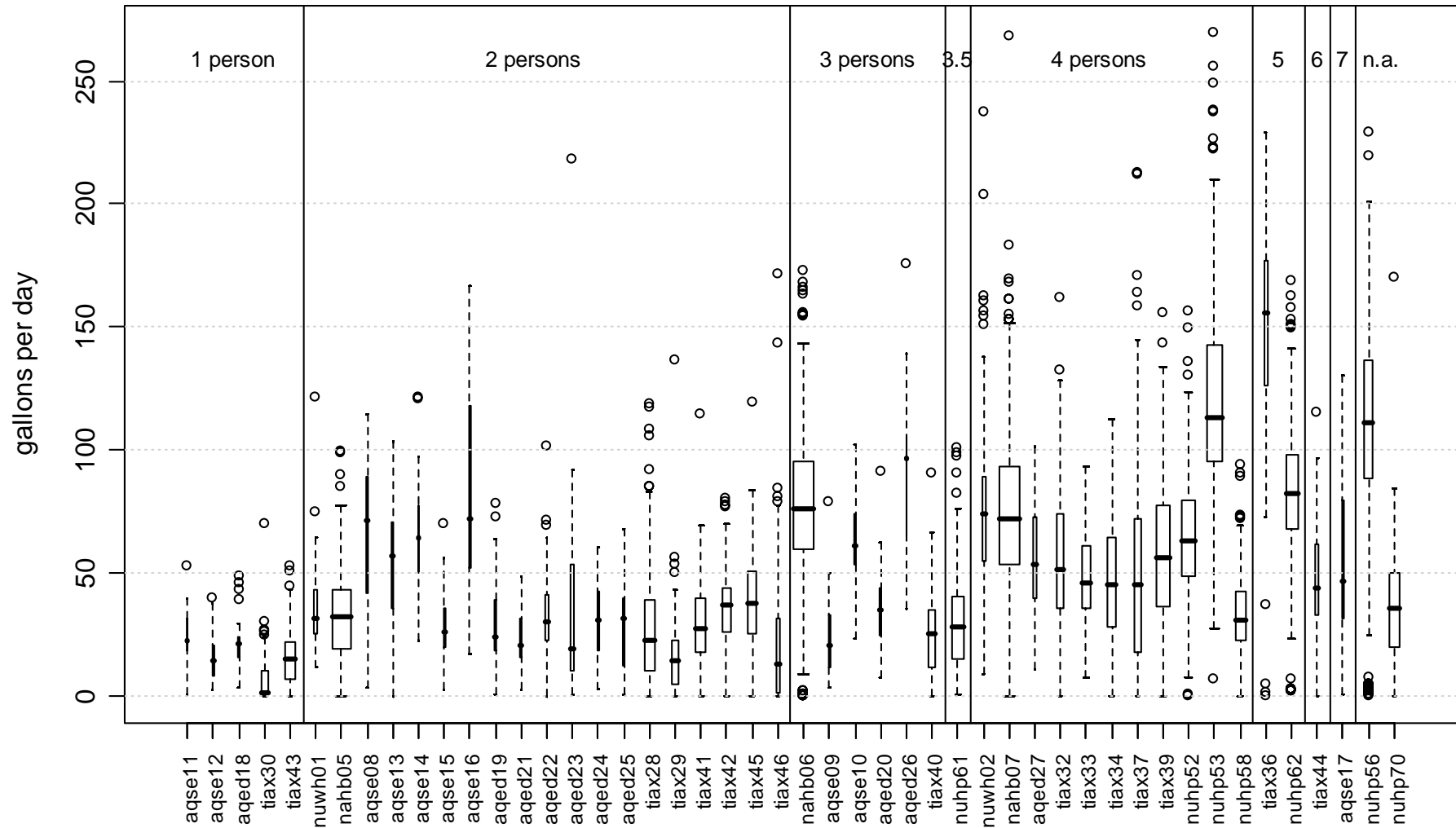
Hot Water Field Studies

- **Northeast Utilities Tankless Electric Water Heater Study**
 - Tankless electric water heaters were tested and compared to customers' existing gas and electric storage water heaters
- **NAHB Research Center Geothermal Water Heating Study**
 - Provide potential users of geothermal water heating systems with information about sizing methods and system performance
- **Seattle Home Water Conservation Study**
- **EBMUD Indoor Residential Water Conservation Study**
 - Impacts and acceptance of high-quality water conservation fixtures and appliances in single-family homes
- **TIAX Market-Optimized Heat Pump Water Heater Field Study**
 - Field test of two generations of prototype market-optimized HPWHs
- **Northeast Utilities Heat Pump Water Heater Field Test**
 - Field test of HPWH to improve on estimates of hot water usage and water heating energy use
- **Gas Technologies Institute Condensing Water Heater Field Study**
 - Field study of a market optimized condensing gas water heater for residential applications
 - Not yet in database

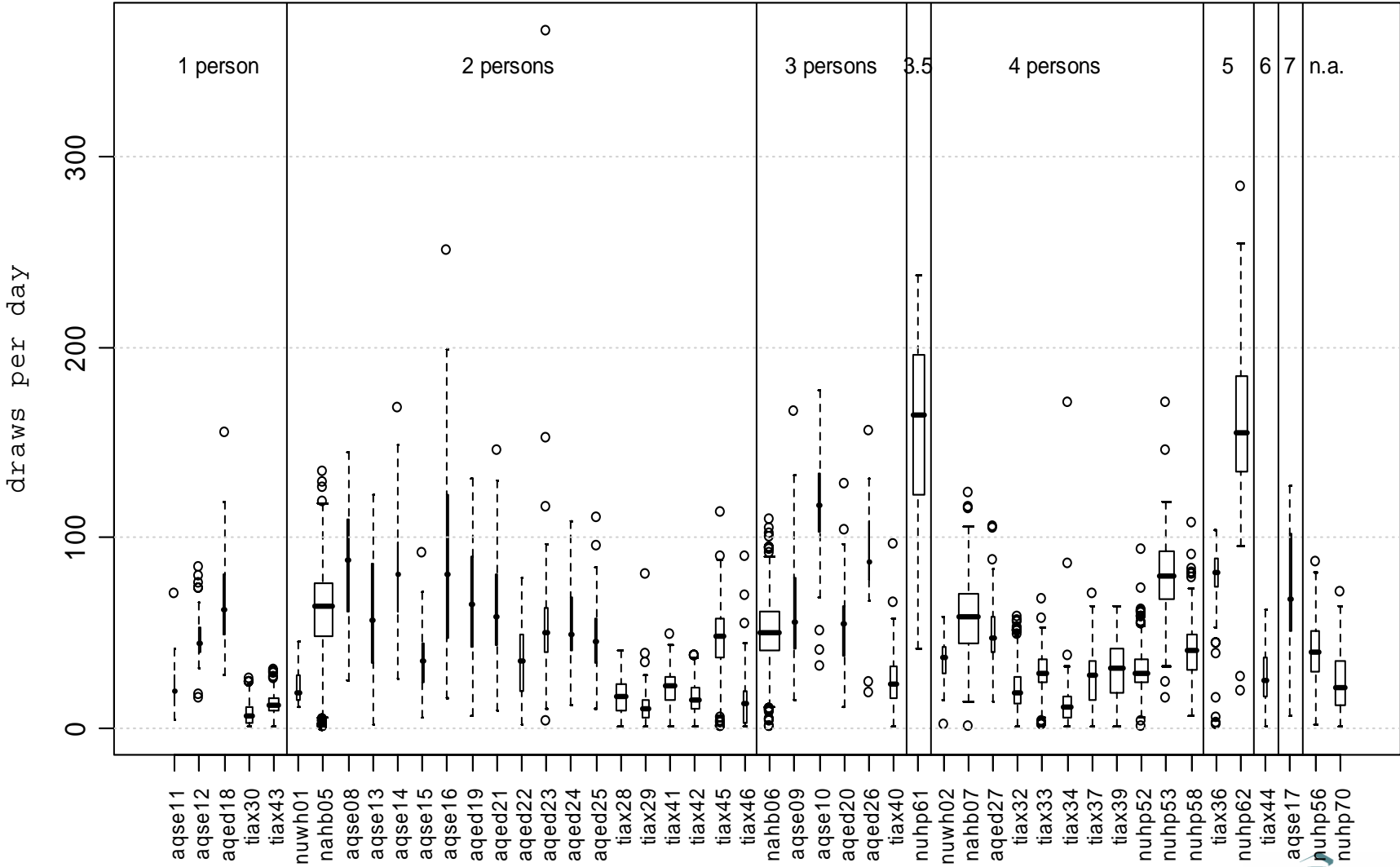
Locations of Monitored Houses



Daily Hot Water Volume by House



Daily Hot Water Draws by House



Implications for Tankless Water Heaters

- ❑ Many more draws per day than DOE EF test
- ❑ Implies larger amount of cycling losses
- ❑ CEC may degrade the listed EF for tankless water heaters by 8.8%

Potential Water Use Differences

- “Endless” hot water
 - Do people take longer showers?
- Minimum draw to fire
 - Do people use more water for small draws?
 - e.g. shaving, rinsing dishes, showerhead turnoff, ...
- Minimum time to fire
 - Do people keep hot water on for intermittent draws?
 - e.g. shaving, rinsing dishes, ...