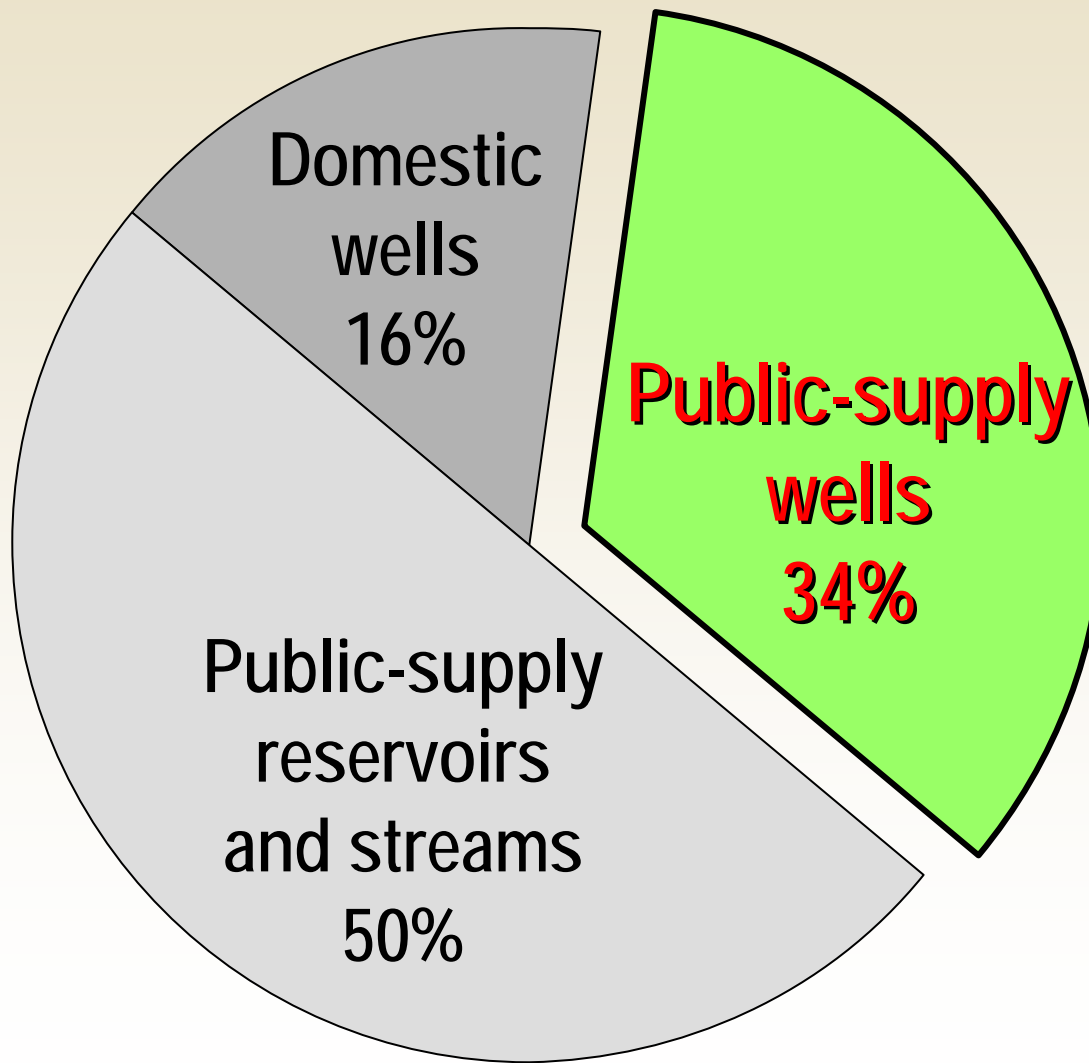


# Contaminants in Groundwater Sources Used for Public Supply

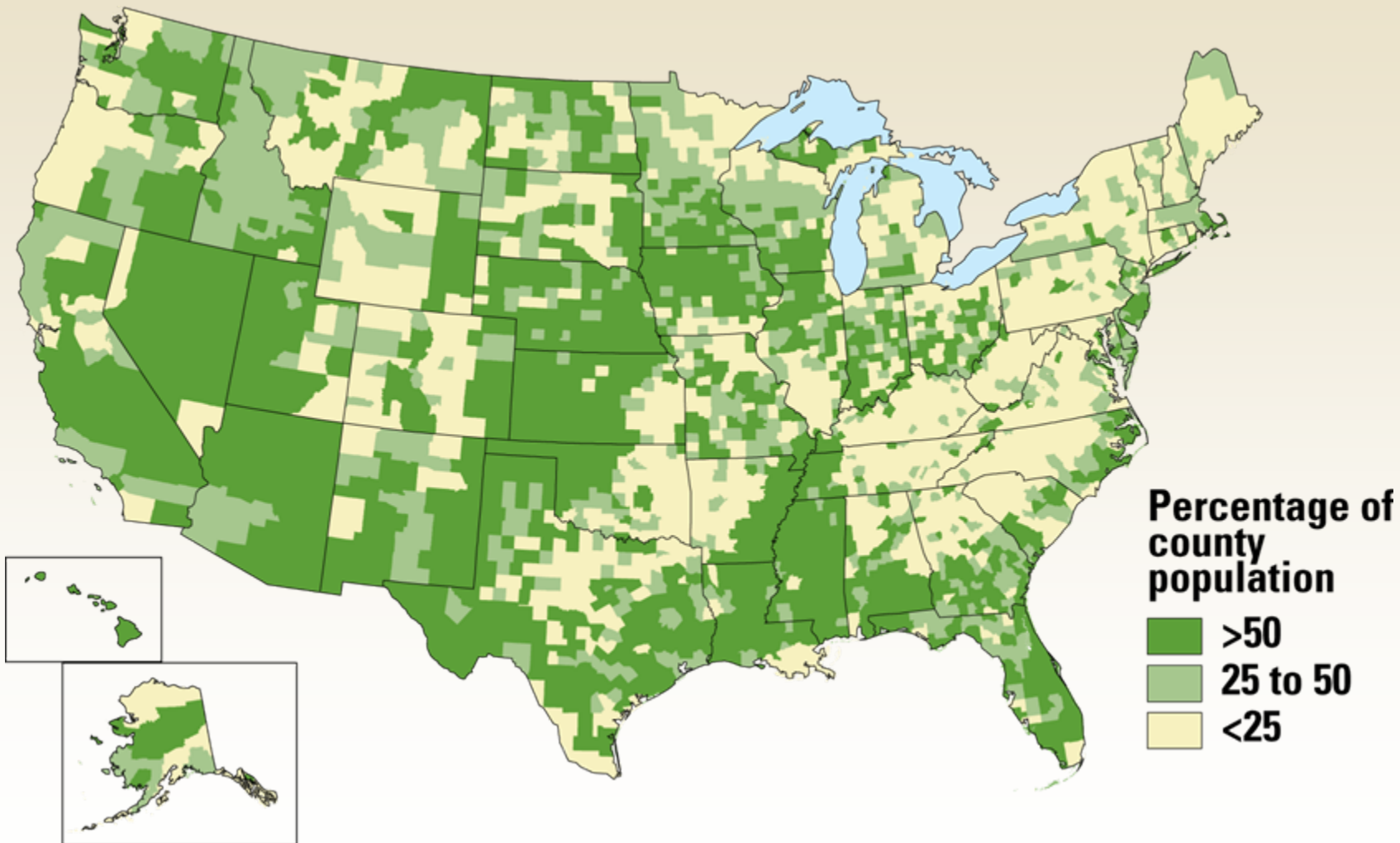
Patty Toccalino and Jessica Hopple



# Drinking-water sources serving the U.S. population



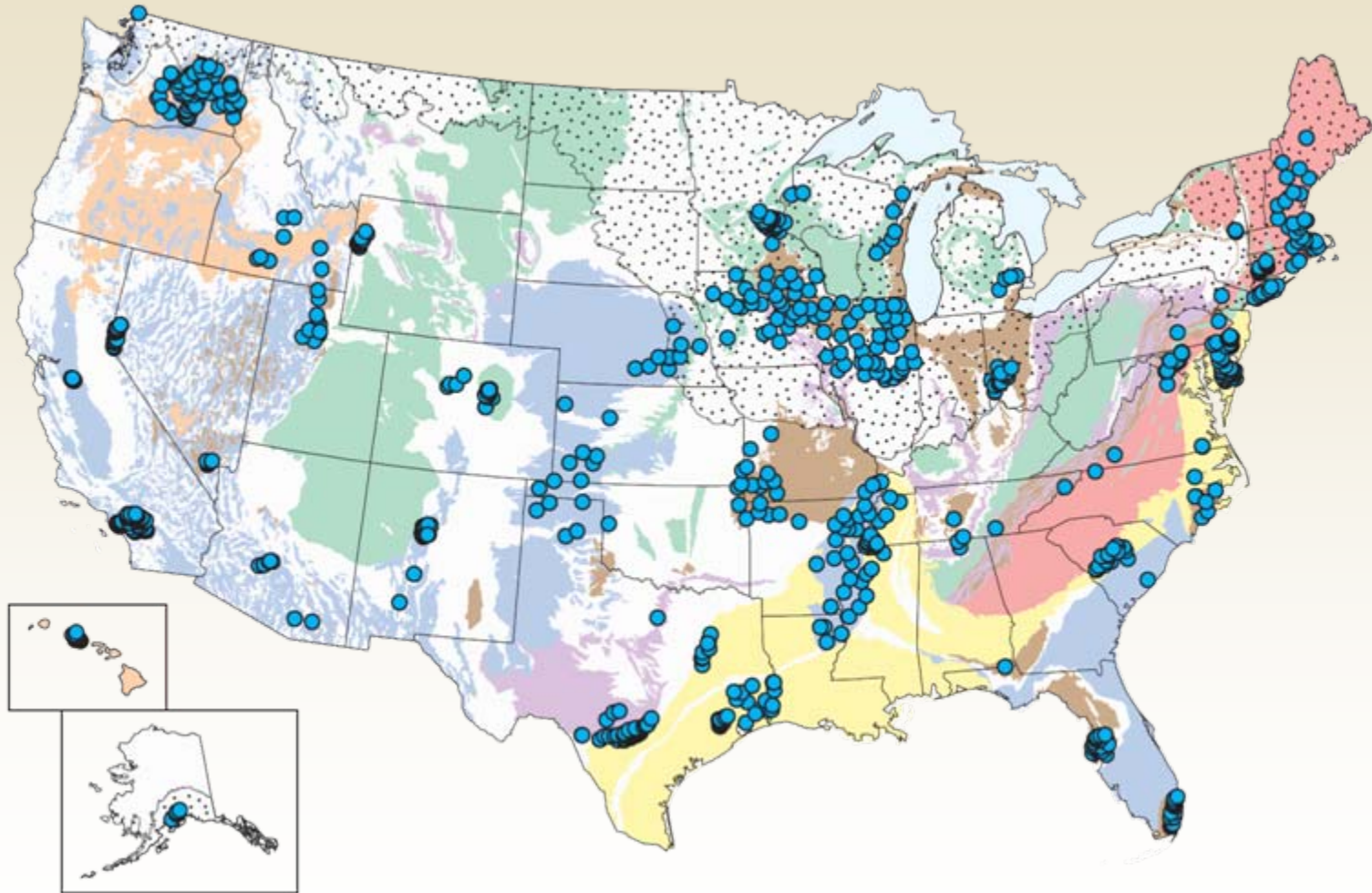
# Public wells are a primary source of drinking water in many areas



# What makes this study different?

- Assesses more contaminants
- Focuses on source water, but includes selected comparisons to finished water
- Nationally consistent methods
- Lower detection levels
- Expanded coverage of human-health benchmarks
- Evaluates contaminant mixtures

# 932 public wells sampled in 30 principal aquifers



# 337 contaminants analyzed

## 44 Inorganic

### Natural sources

- Major ions
- Trace elements
- Radionuclides

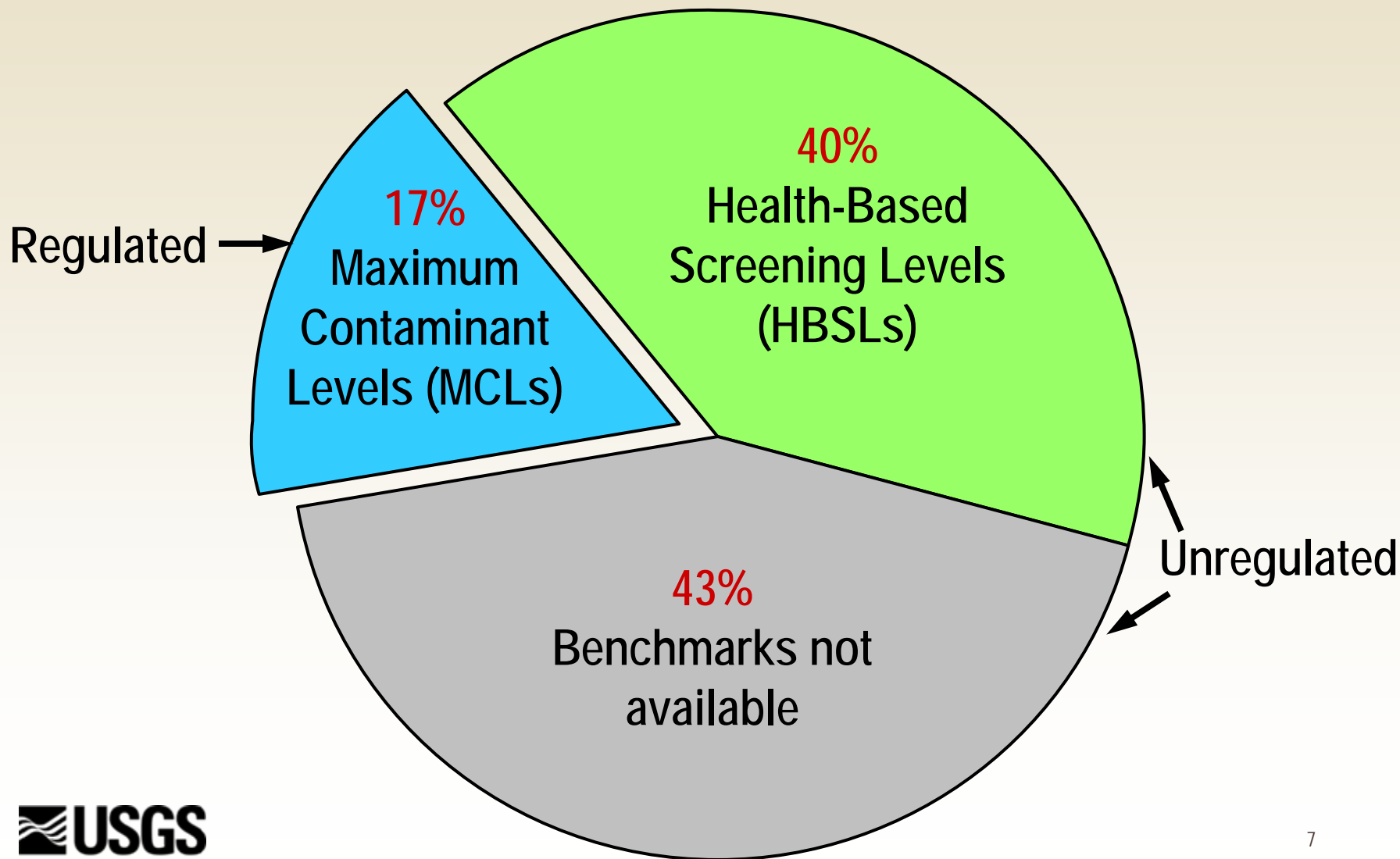
### Mainly man-made sources

- Nitrate

## 293 Man-made organic

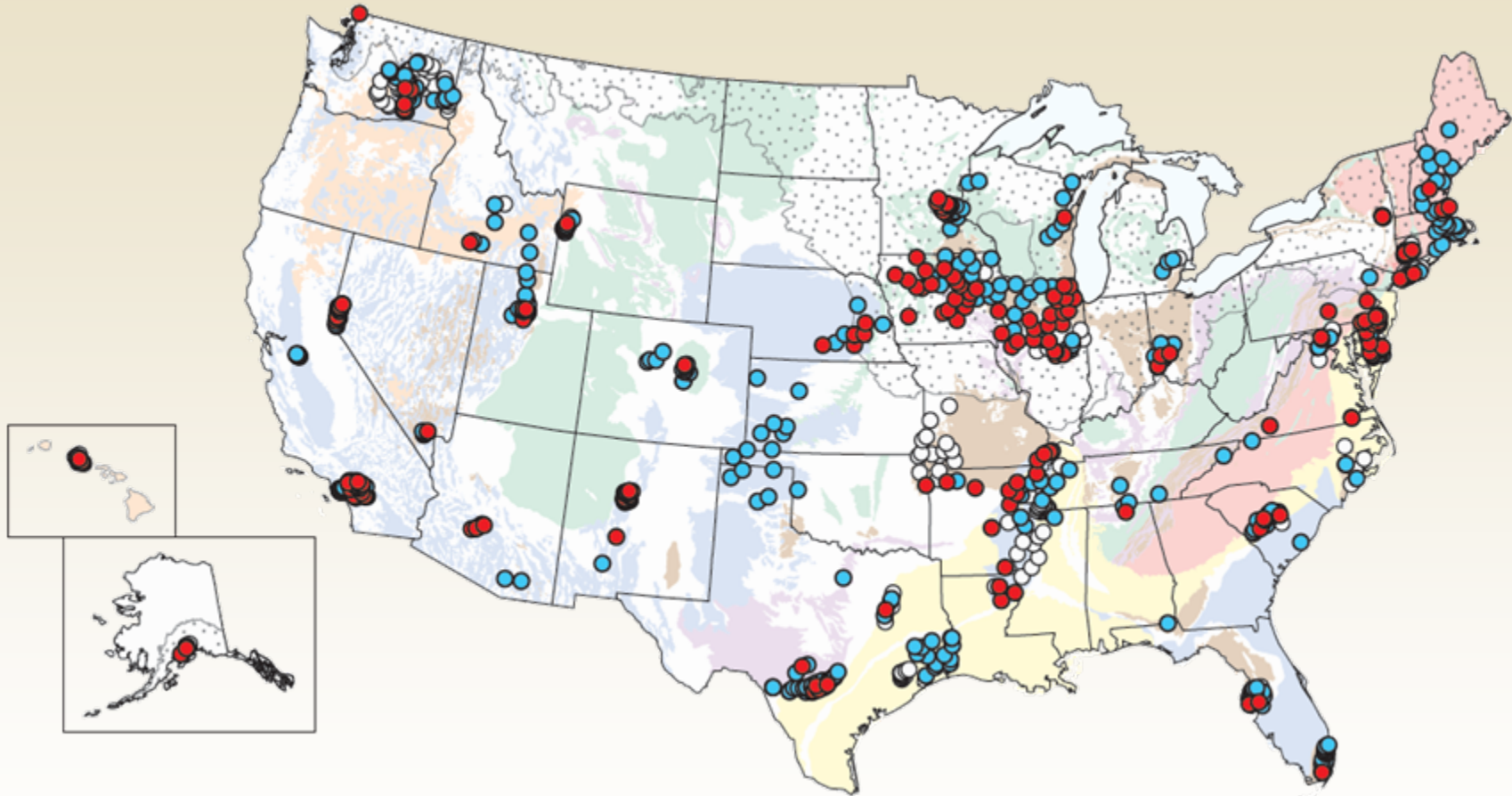
- Pesticide compounds
- Volatile organic compounds (VOCs)
- Personal-care and domestic-use
- Other

# Human-health benchmarks were available for 193 of 337 contaminants



**How often are contaminants in public wells a potential health concern?**

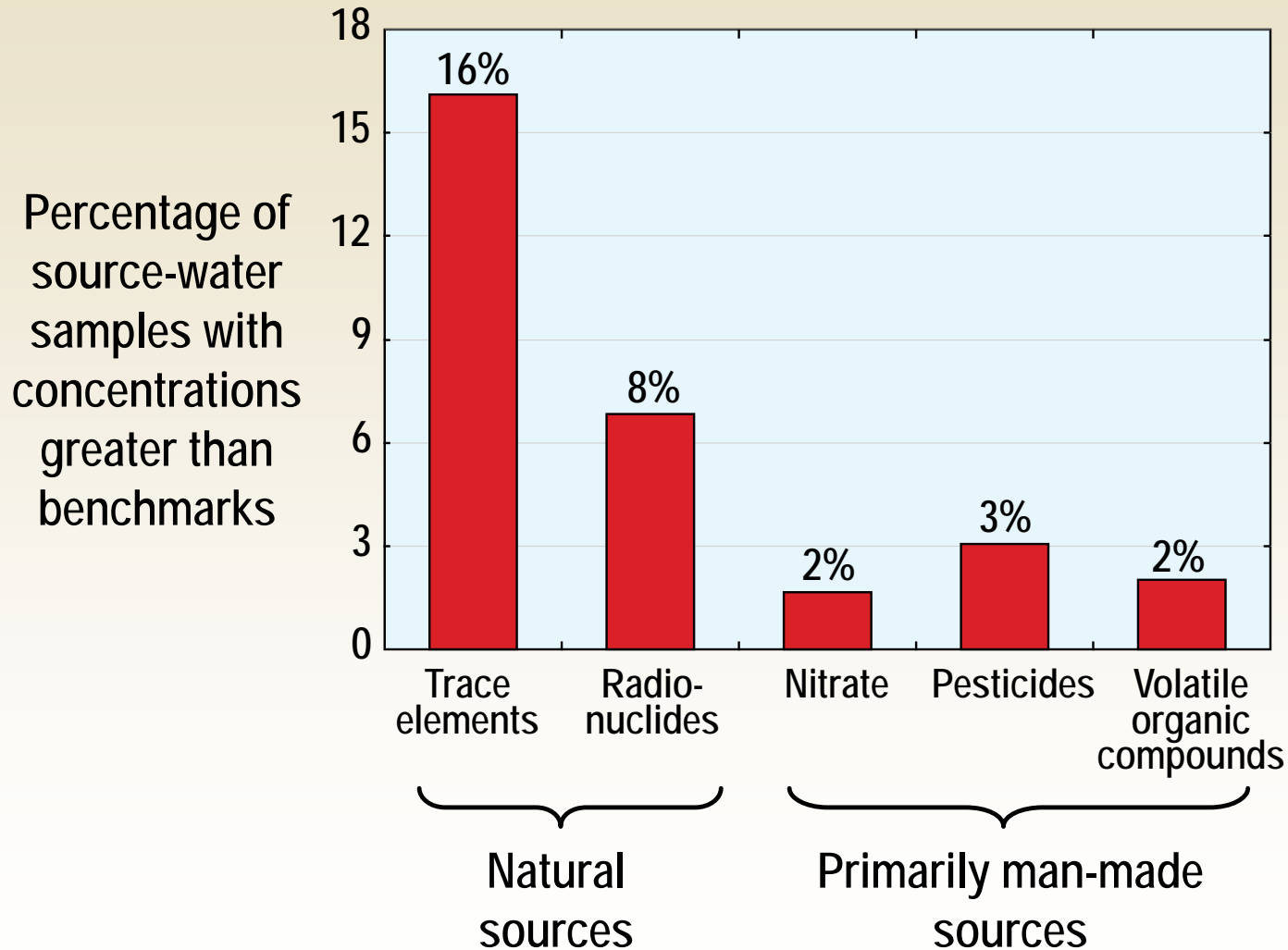
# 1 in 5 source-water samples had concentrations greater than benchmarks



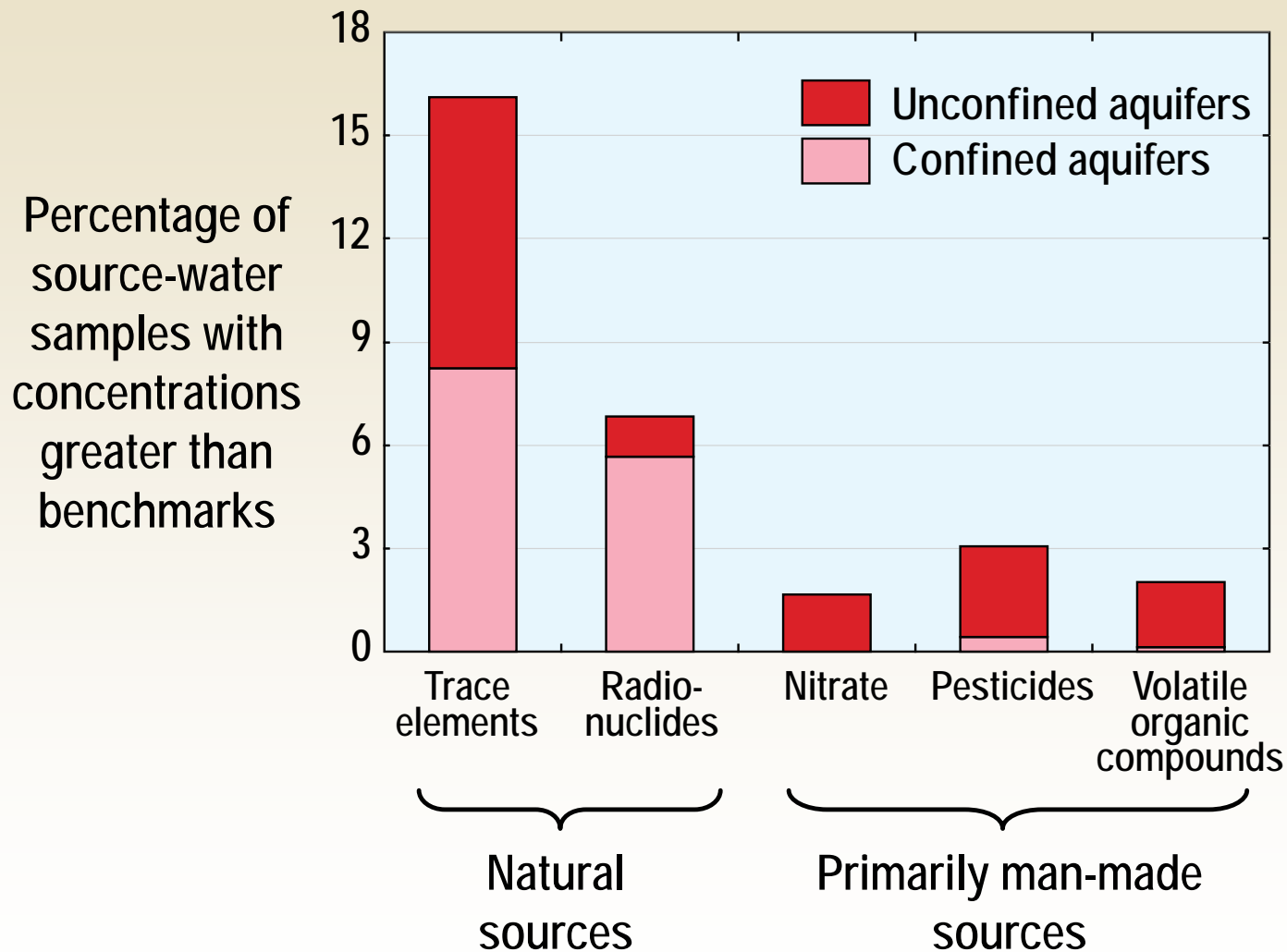
● Greater than MCL or HBSL (22%)

● Greater than one-tenth of MCL or HBSL (58%)

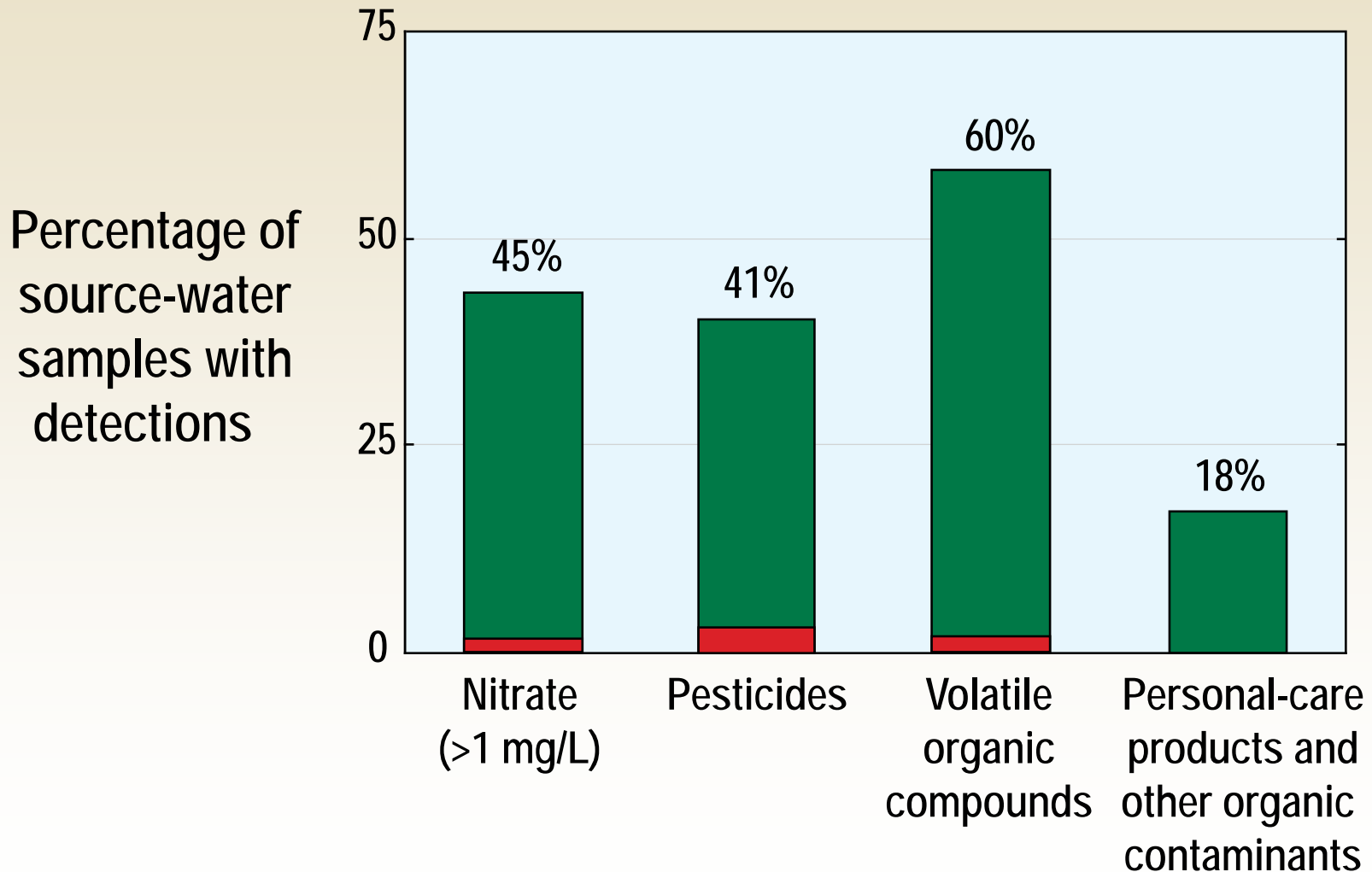
# Contaminants from natural sources accounted for most concentrations greater than benchmarks



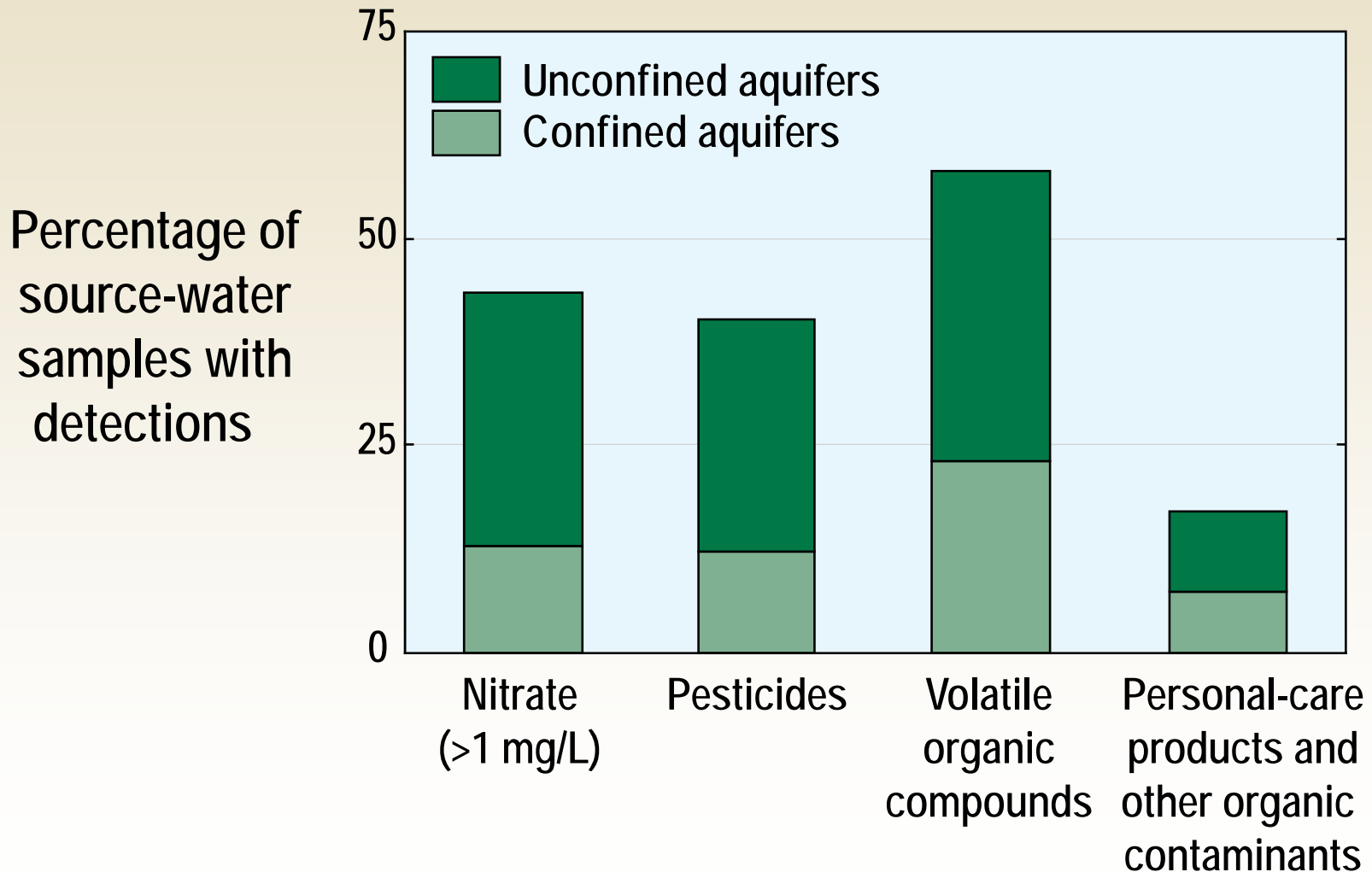
# Contaminants from natural sources accounted for most concentrations greater than benchmarks



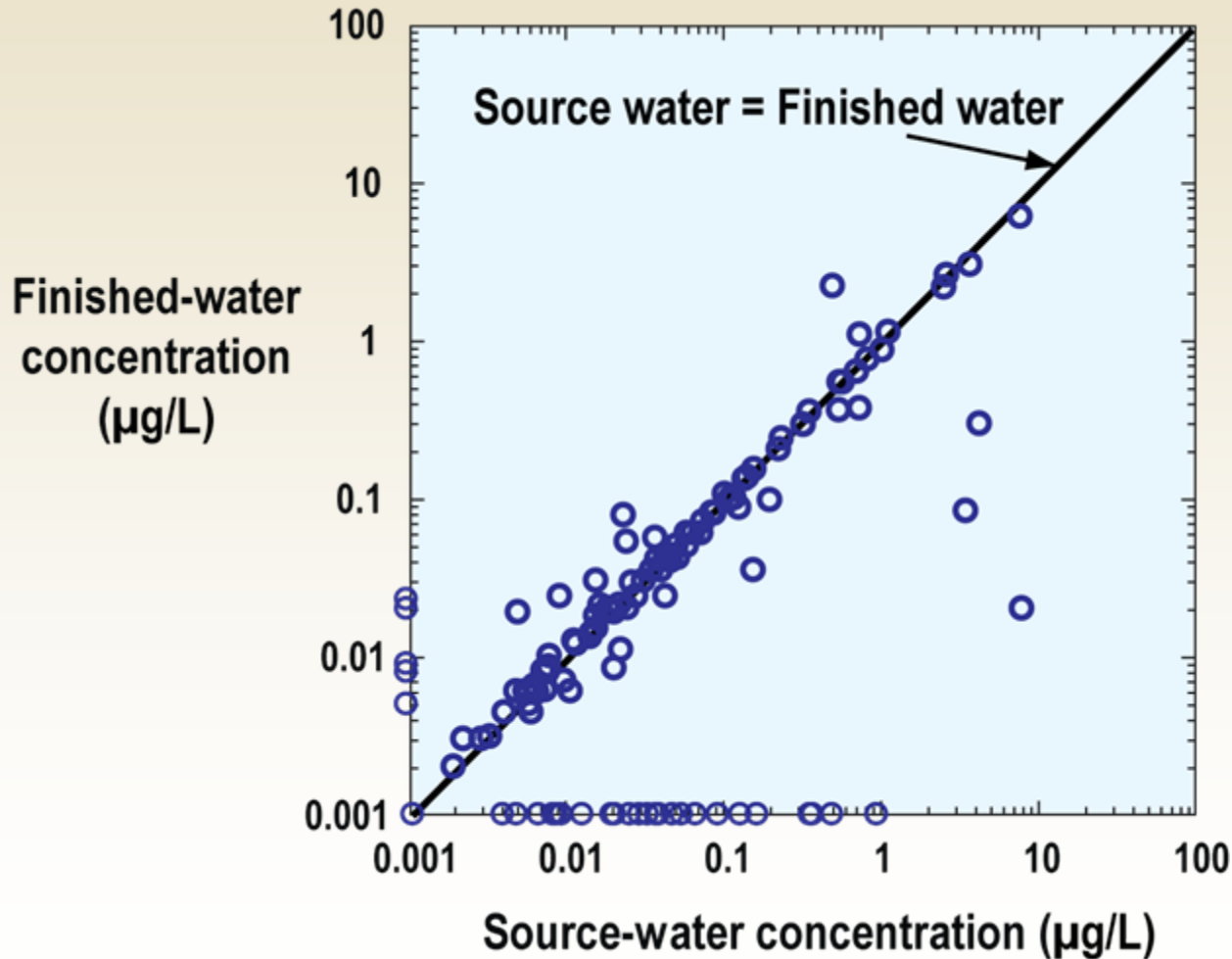
# Contaminants from man-made sources were detected in most samples



# Contaminants from man-made sources were detected in most samples

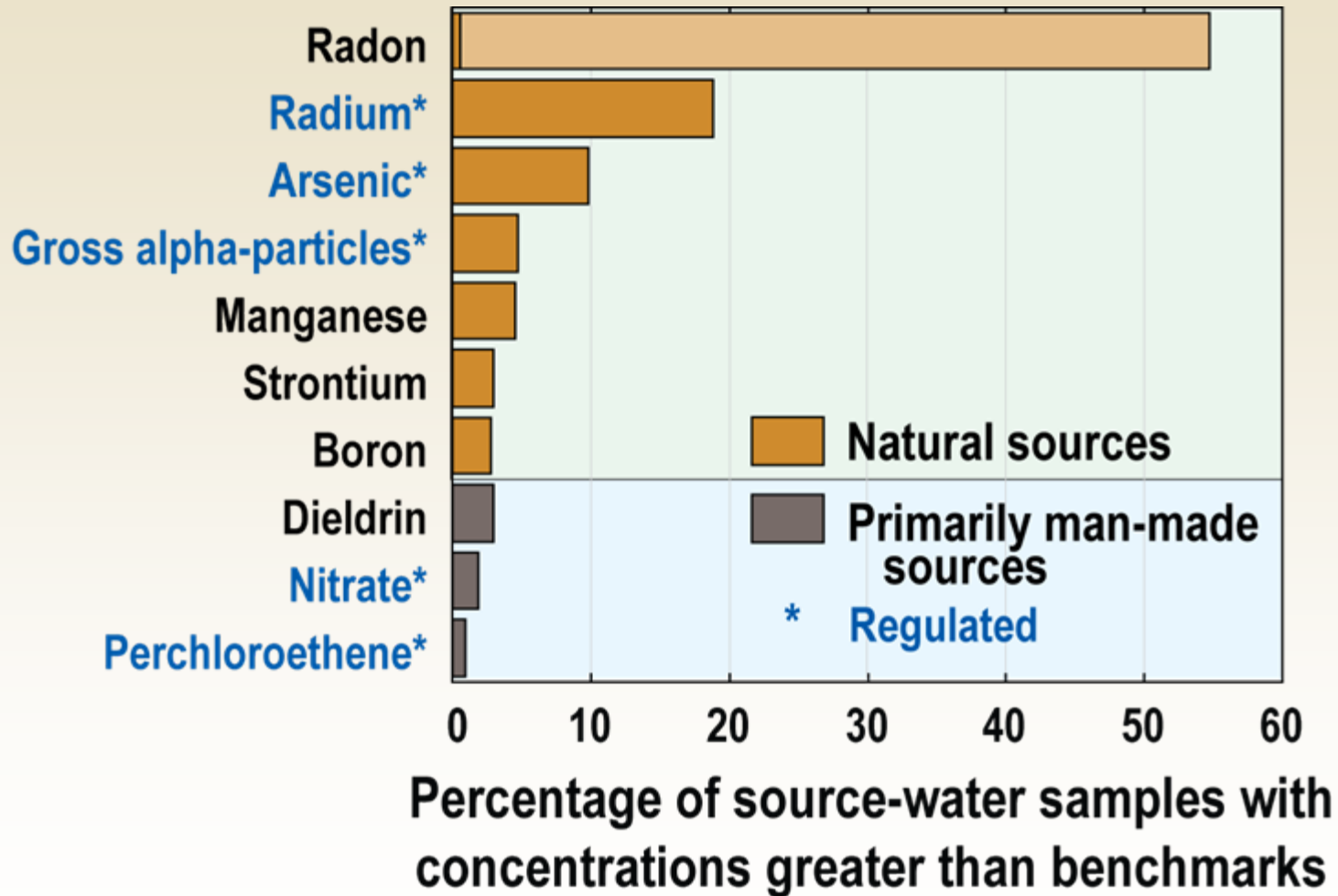


# Concentrations of the most common organic contaminants were similar in source and finished water

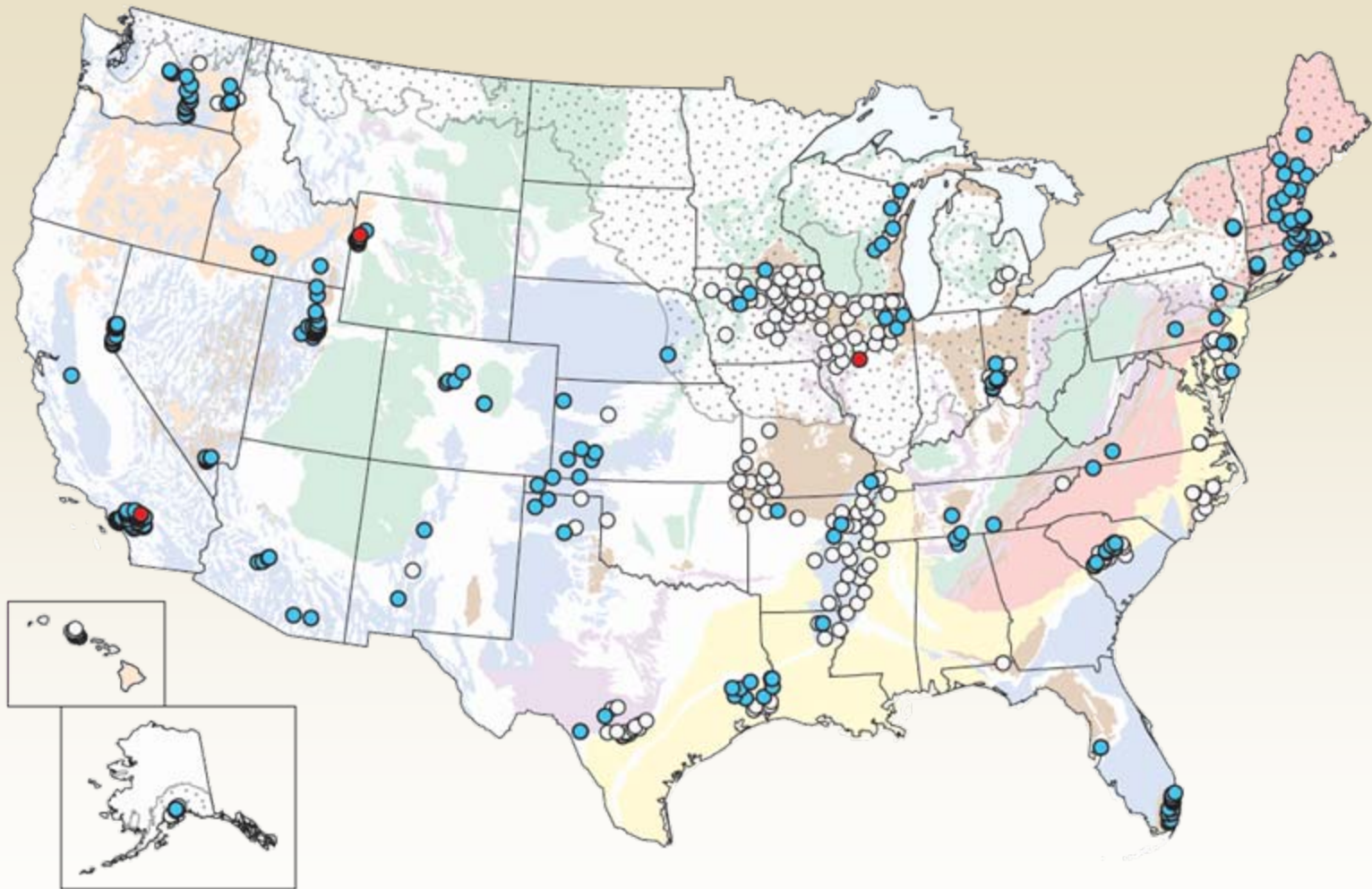


**Which contaminants are of most concern in source water and where do they occur?**

# Top 10 contaminants with concentrations greater than benchmarks



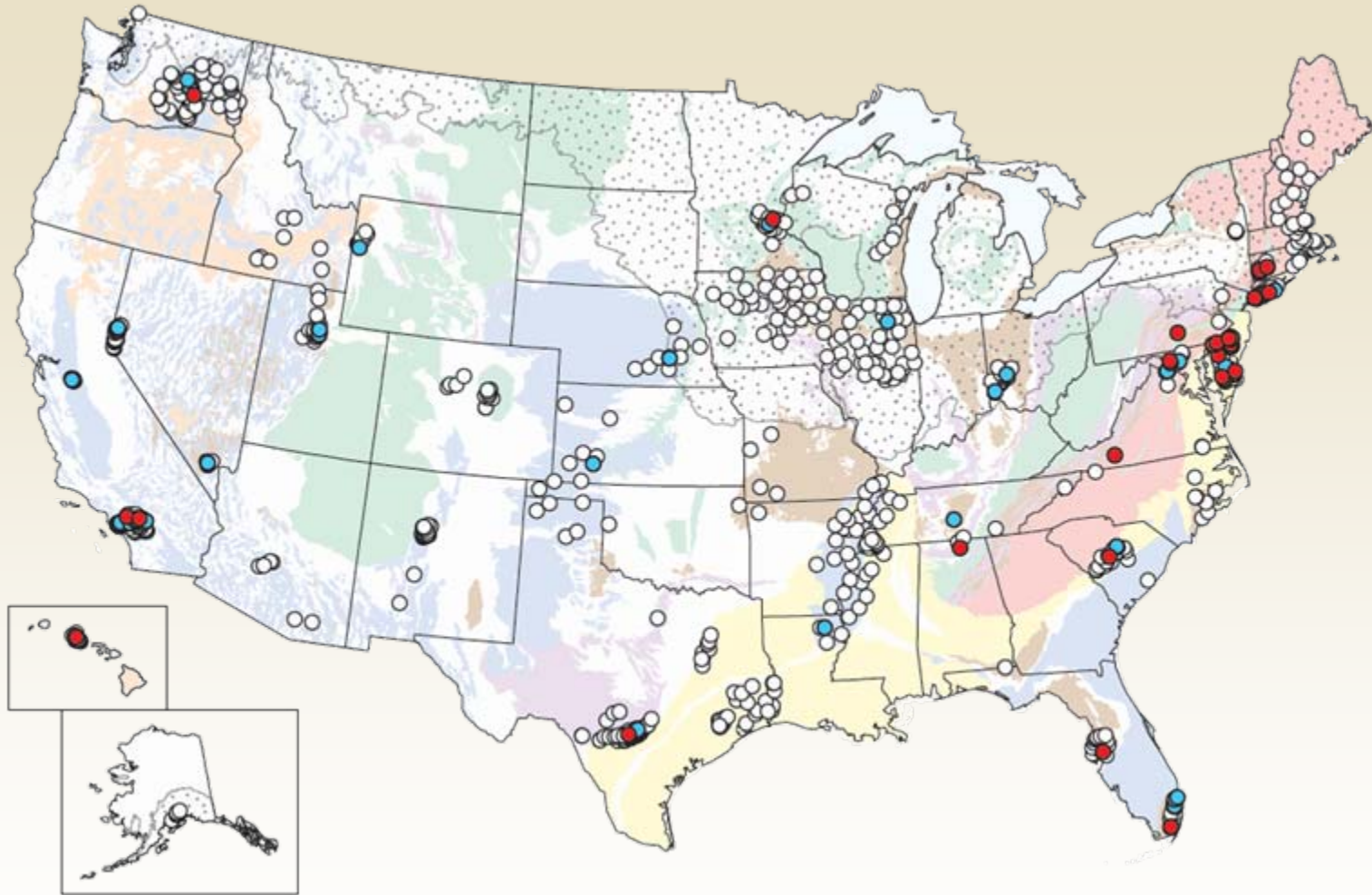
# Radon in source water



● Greater than proposed Alternative MCL of 4,000 pCi/L (0.6%)

● Greater than proposed MCL of 300 pCi/L (55%)

# Pesticides and VOCs in source water

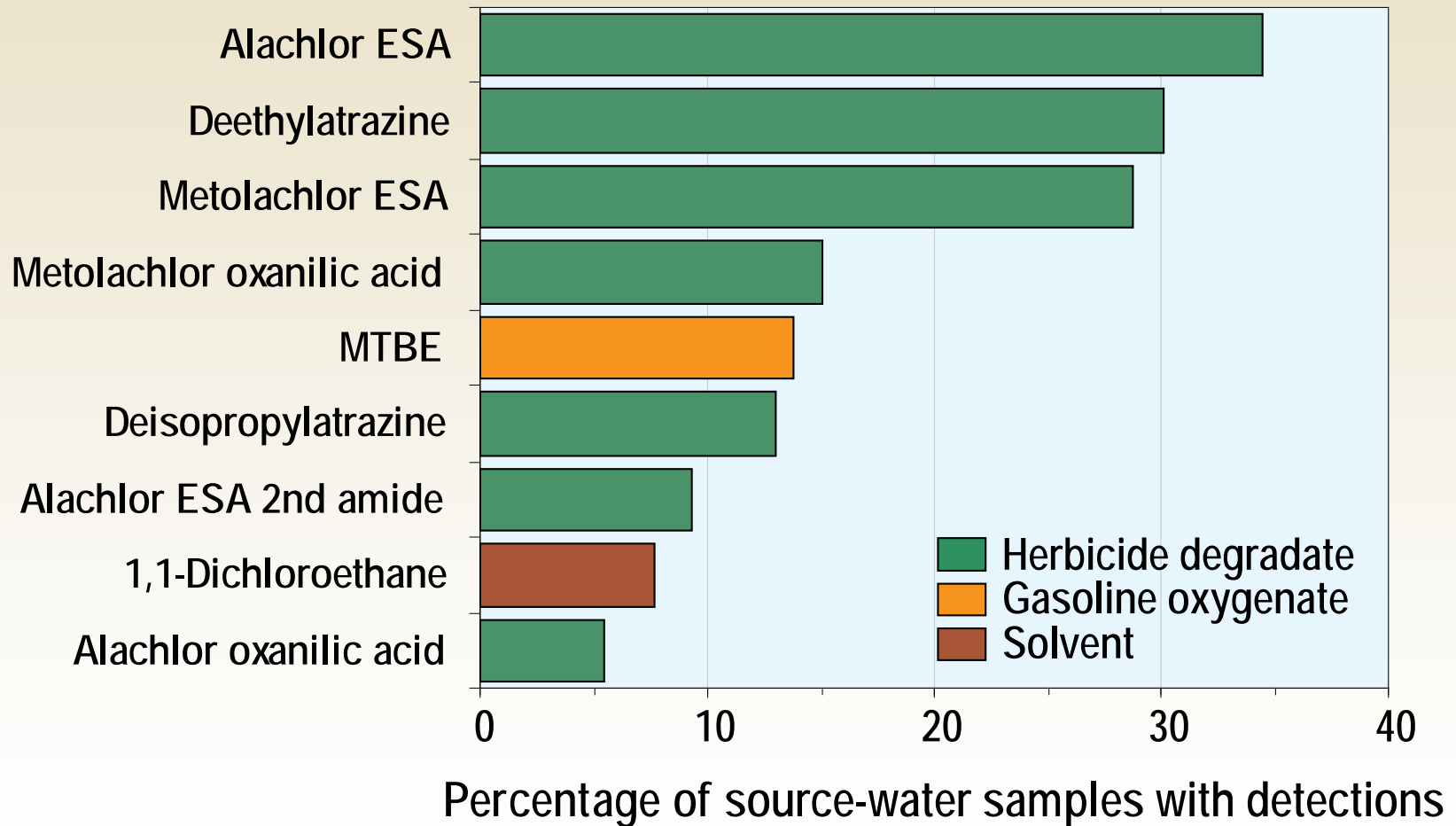


● Greater than MCL or HBSL (5%)

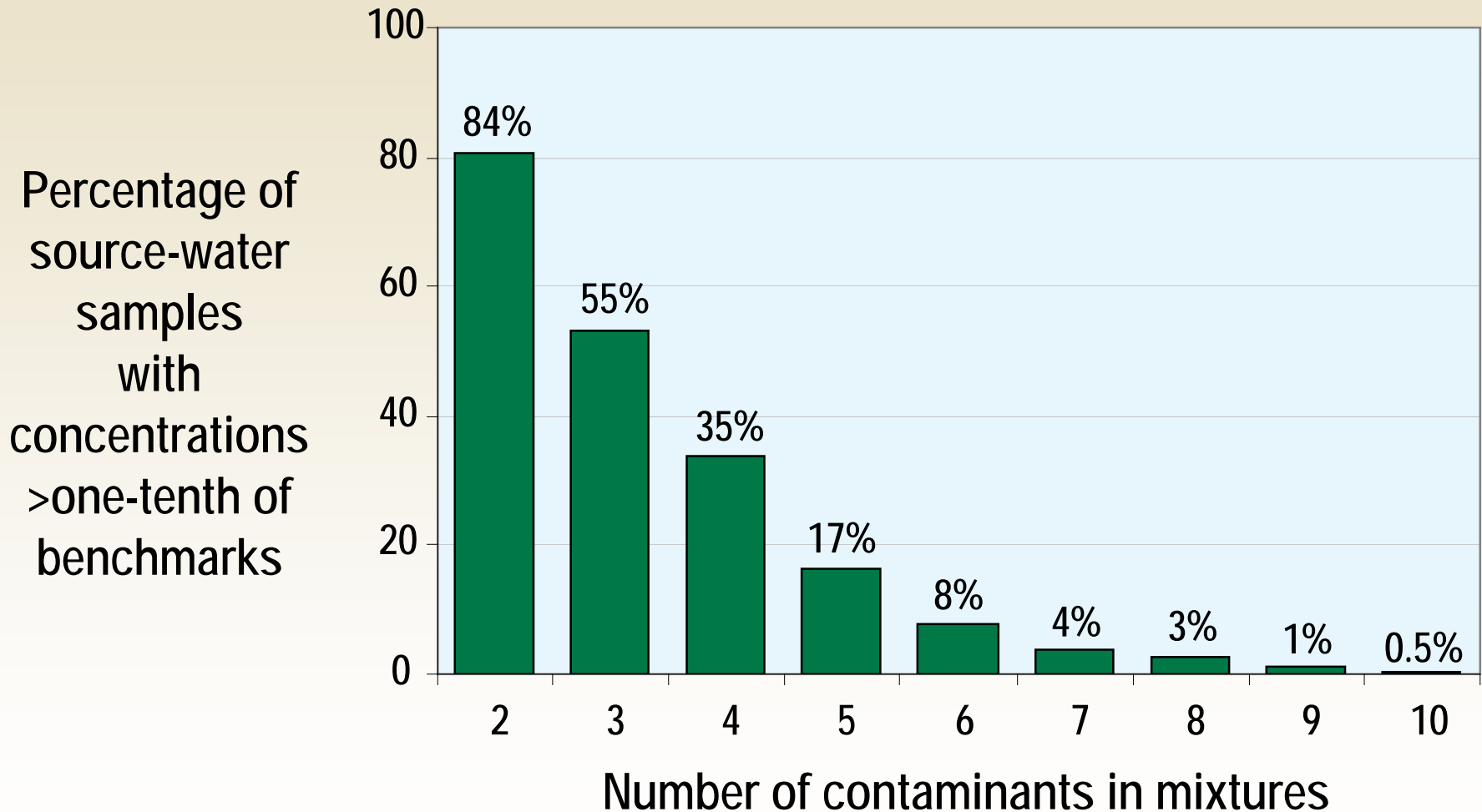
● Greater than one-tenth of MCL or HBSL (5%)

What are the most important remaining information gaps?

# Benchmarks are not available for some commonly detected organic contaminants



# Most samples had mixtures of contaminants



# Key findings and implications

- Source water from 1 in 5 public wells may need treatment or blending to reduce levels below health benchmarks
- Natural contaminants are the most common concern, but generally are not affected by wellhead protection
- Man-made contaminants were detected in most samples, and wellhead protection and source controls are important for managing their occurrence
- Potential health concerns cannot yet be assessed for many contaminants and most mixtures

## Contaminants in Groundwater Sources Used for Public Supply

For more information:

[http://water.usgs.gov/nawqa/studies/public\\_wells](http://water.usgs.gov/nawqa/studies/public_wells)

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