



Smart Management for  
Small Water Systems

# What Challenges do Different Sizes & Types of Systems Face?

February 27, 2018 | Nicholas Willis, WSU EFC

[www.efcnetwork.org](http://www.efcnetwork.org)



American Water Works  
Association

This program is made possible under a cooperative agreement with the U.S. EPA.



# Overview

Outline of Water Utilities in USA

The Challenge of Compliance & Quality Water

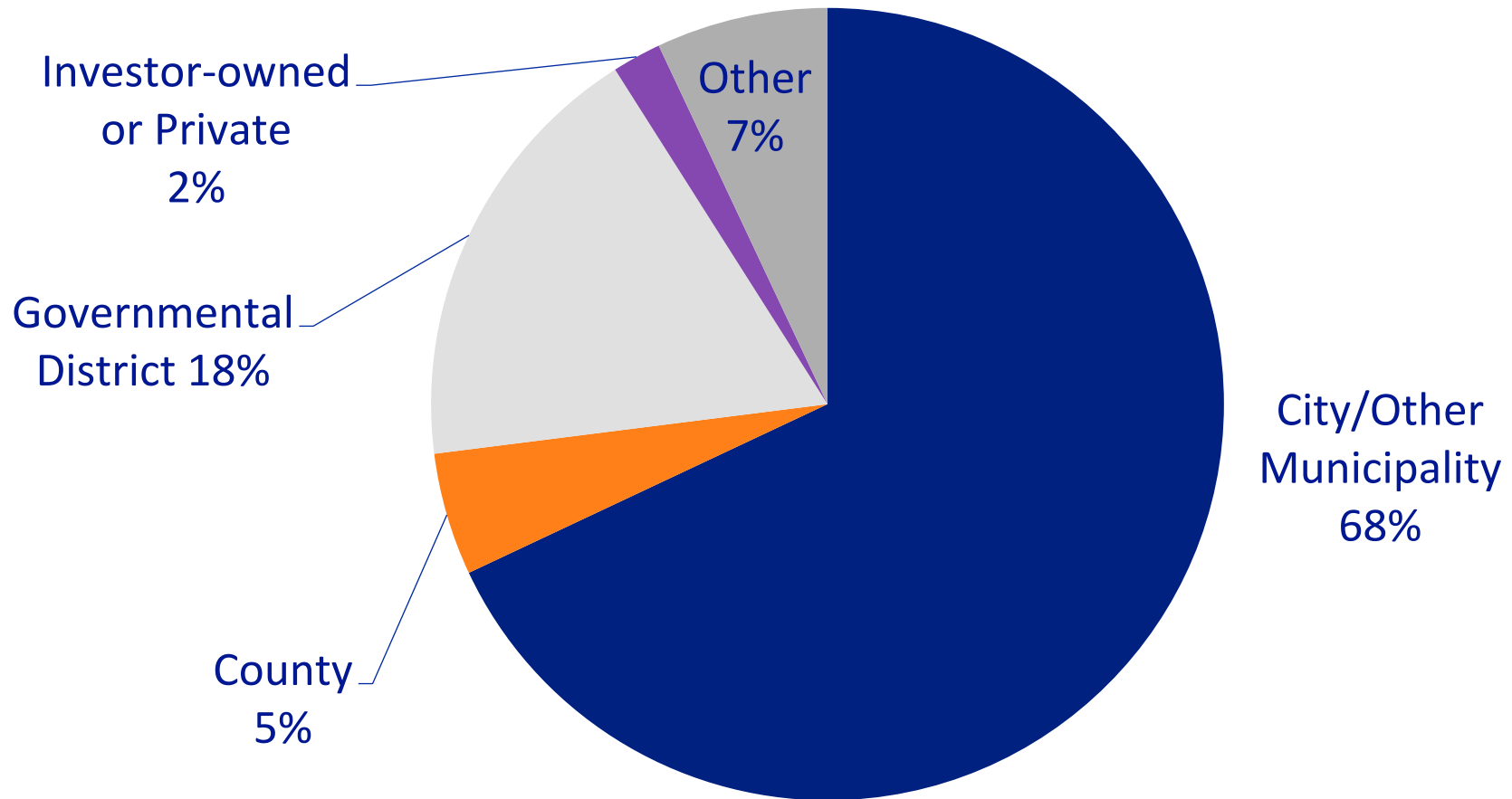
The Demographic Challenge

The Management Challenge



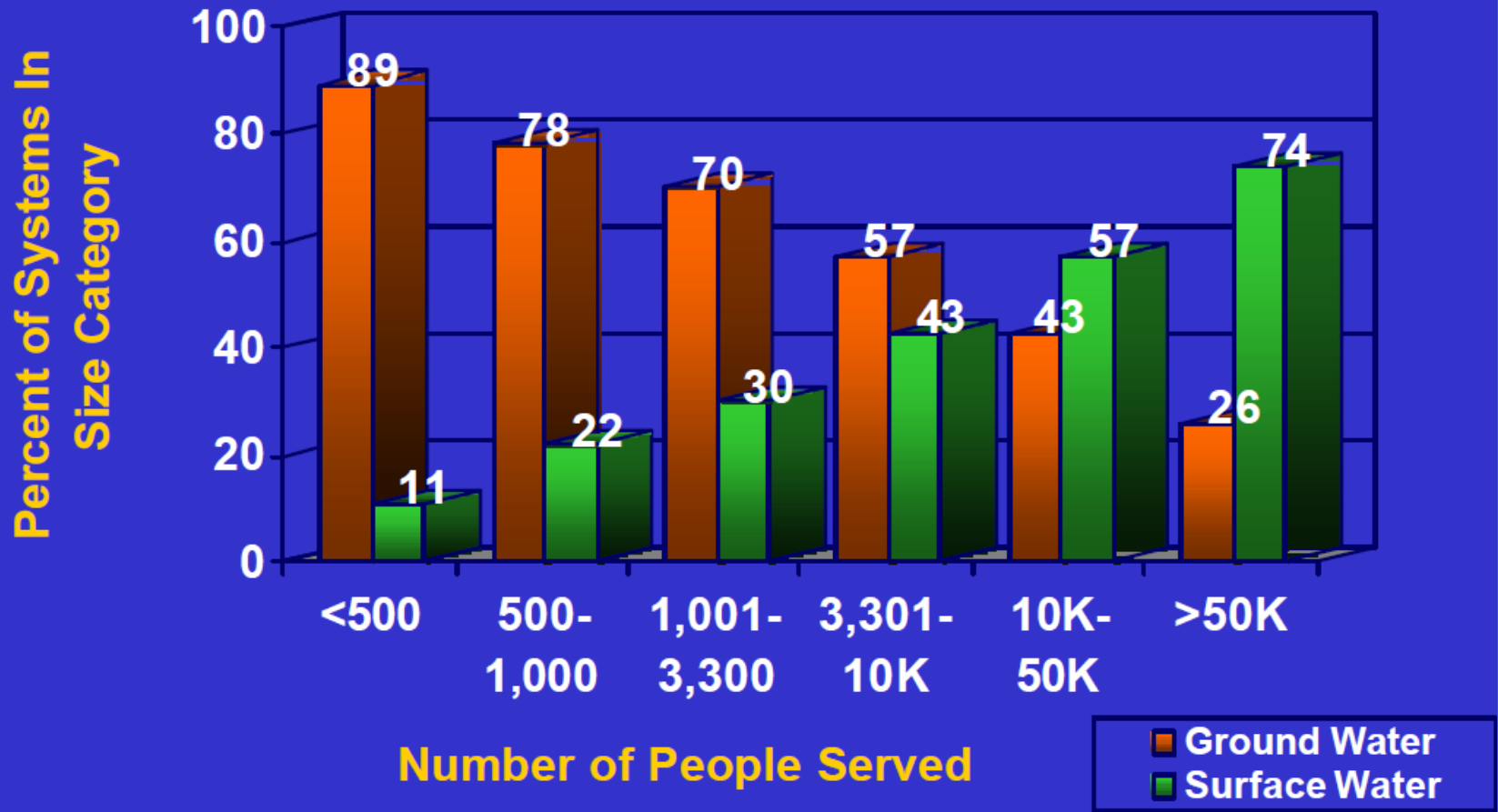
52,000 water utilities across US  
42,000+ utilities serve 3,300 or less  
24.4M served by small systems

# Water Utility Ownership



*Source: AWWA 2010 Water and Wastewater Rate Survey*

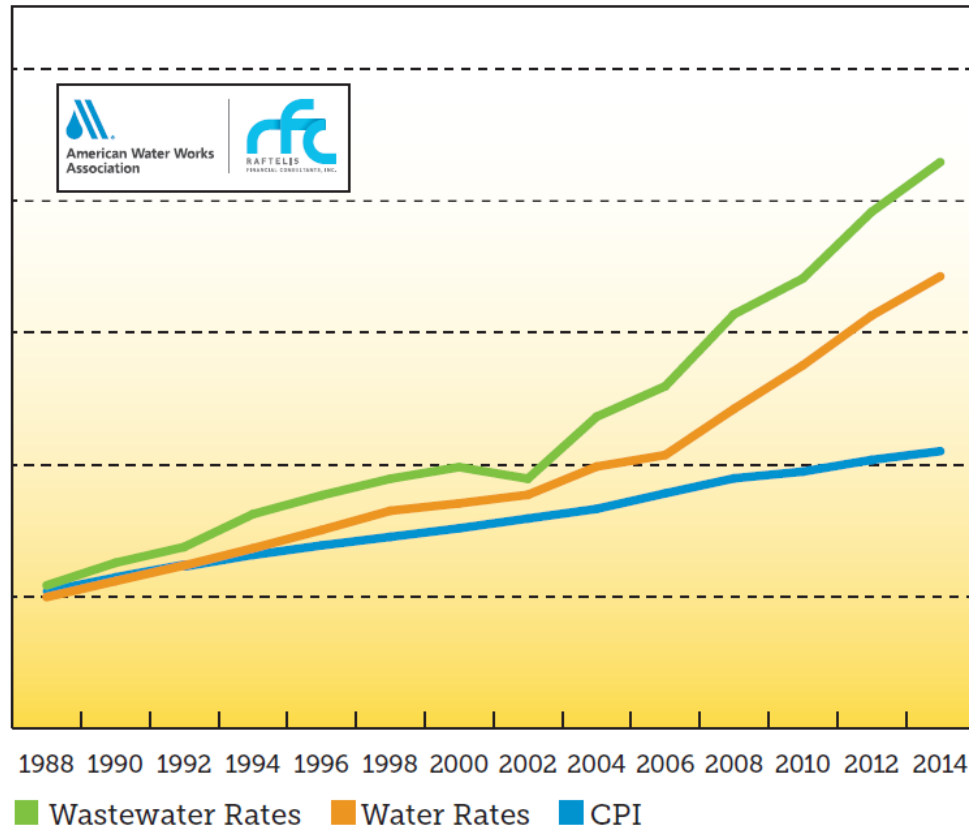
# CWSs by Source



\*Community Water System

Source: "Overview of the Safe Drinking Water Act" USEPA & Drinking Water Academy - 2002

## Typical Water and Wastewater Bills\*



\*Residential monthly water or wastewater bills at a usage level of 7,480 gallons/month CPI: starting with the average of the water and wastewater bills in 1988, this level increases based on changes in the Consumer Price Index (CPI) provided by the Bureau of Labor Statistics



*From 2014 Water and Wastewater Rate Survey.  
AWWA, 2015*





# **Compliance & Water Quality**

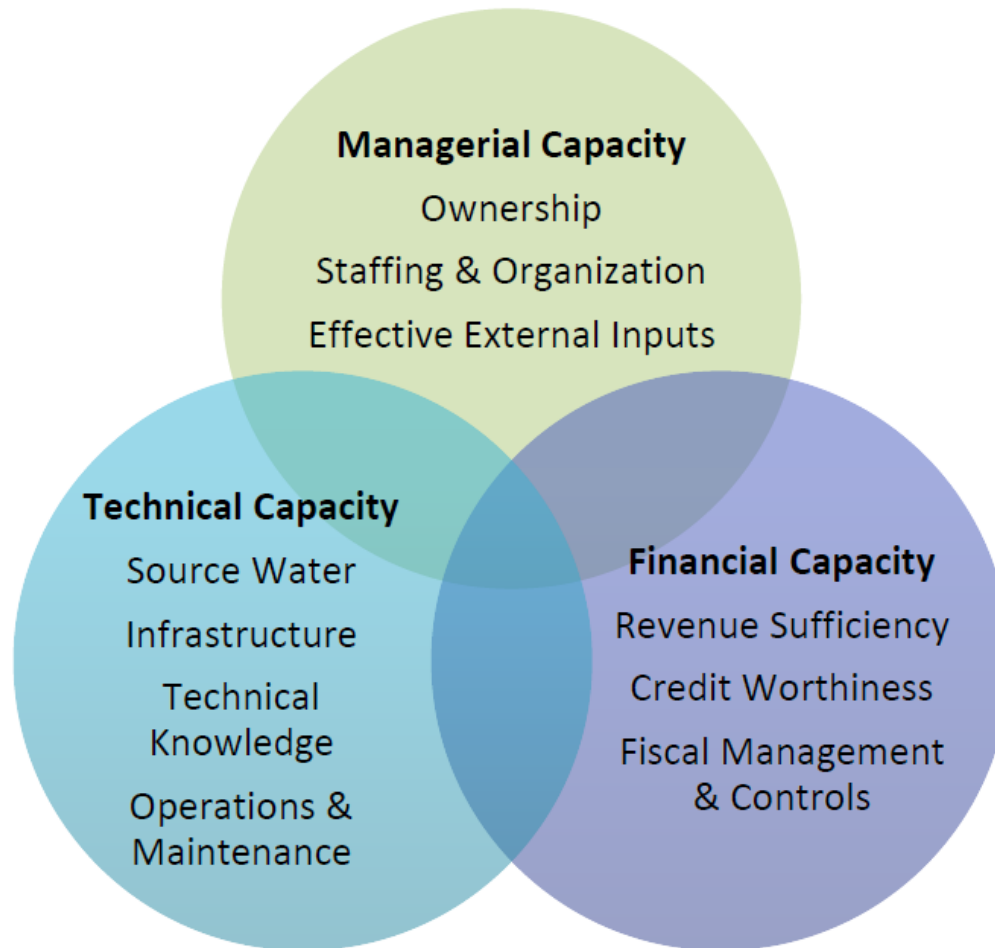
# Early Success in Drinking Water Protection

Typhoid Deaths Per 100,000 People





# Capacity Development



Source: Office of Inspector General (OIG) modification of EPA diagram.



# Water Quality

- Safe Drinking Water Act regulates water quality in all systems
- Standards are the same regardless of size\*
- Monitoring is more frequent for larger systems
- 6% of children in USA are served by a system with health-based violation (USEPA 2013)
- Safe Drinking Water Act becomes:
  - More comprehensive over time
  - More stringent over time



# Water Quality Changes

Regulatory changes can:

- Require extra treatment
- Require new operations
- Require new sources
- Require new infrastructure

Environmental Changes can be:

- Human pollution of sources
- Supply limiting
- Environmental Disruptions



# Failure to Comply

## Health-based water quality violation

- Can be acute (immediate health risk)
  - Pathogens
  - Nitrates (blue baby in infants)
- May be chronic
  - Chemical contaminants (natural & manmade)
  - Long-term exposure toxicity / carcinogen

## Monitoring & Reporting

- Failure to monitor &/or report in correct manner or on-time
- May be sign of lack of technical or managerial capacity



# Compliance Assistance

EPA & States actively work to keep systems in compliance

This includes:

- ✓ Training (like this webinar)
- ✓ Onsite assistance
- ✓ In-person training
- ✓ Offsite assistance
- ✓ Funding (loans, loan forgiveness, grants)



# Meeting Water Quality Challenges

## Gross Over-simplifications:

- Very small, **complex** systems will struggle
- Very small, **simple** systems can do well
- ❖ Larger, **complex** systems can make do
- ❖ Larger, **simple** systems can stay compliant
- **Surface water** systems challenging to operate
- **Groundwater** systems simple to operate
- Treatment adds complexity and risk



# Water Quality Futures

Consider regionalization

Get out of treatment business or wholesale to others

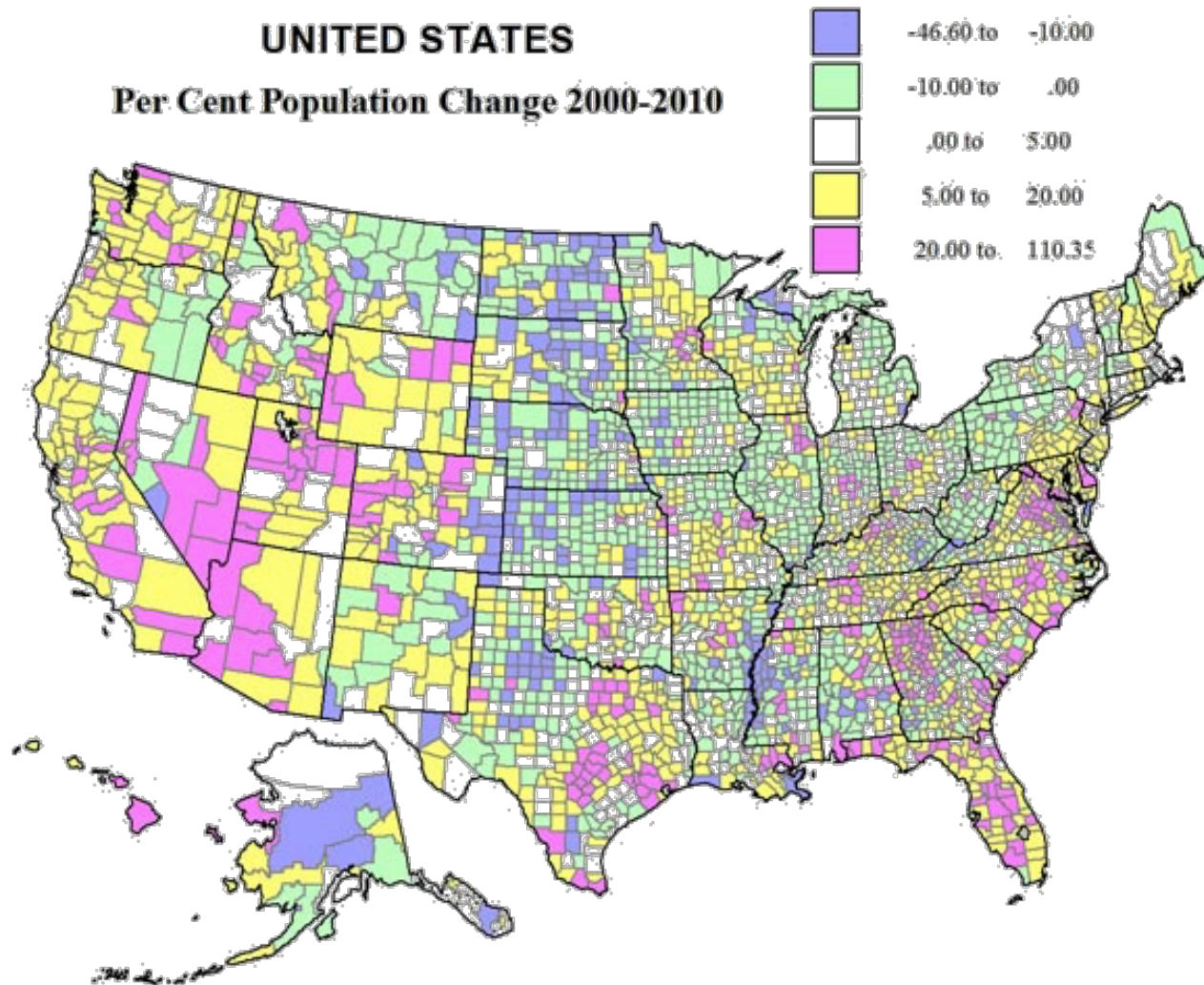
Protect sources

What is treatment replacement?

Movement to membrane to protect against changes to water quality and future regulations

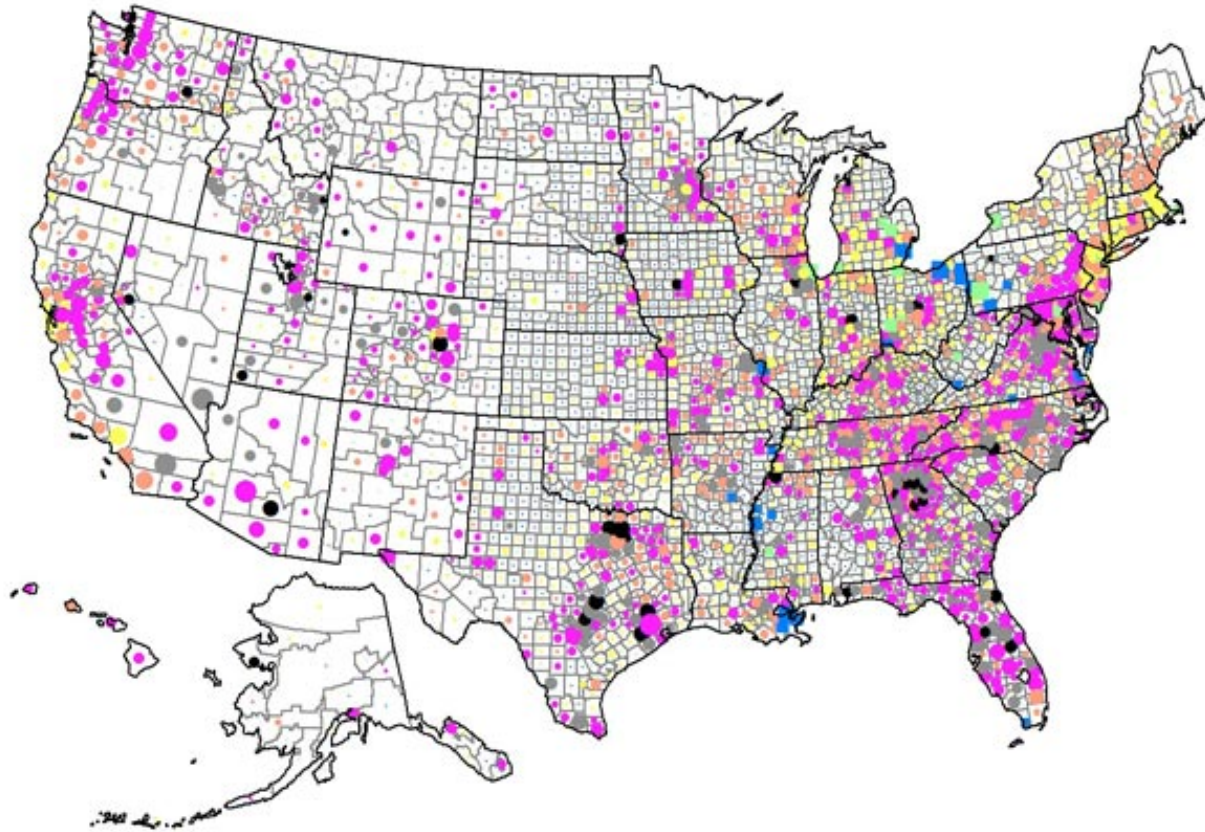


# Challenges of Demographics

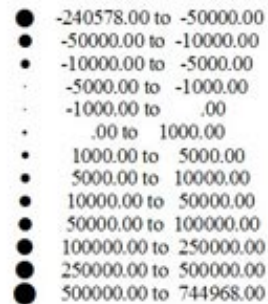


# UNITED STATES

Percent and absolute Change, 2000-2010



**Absolute Change (size)**

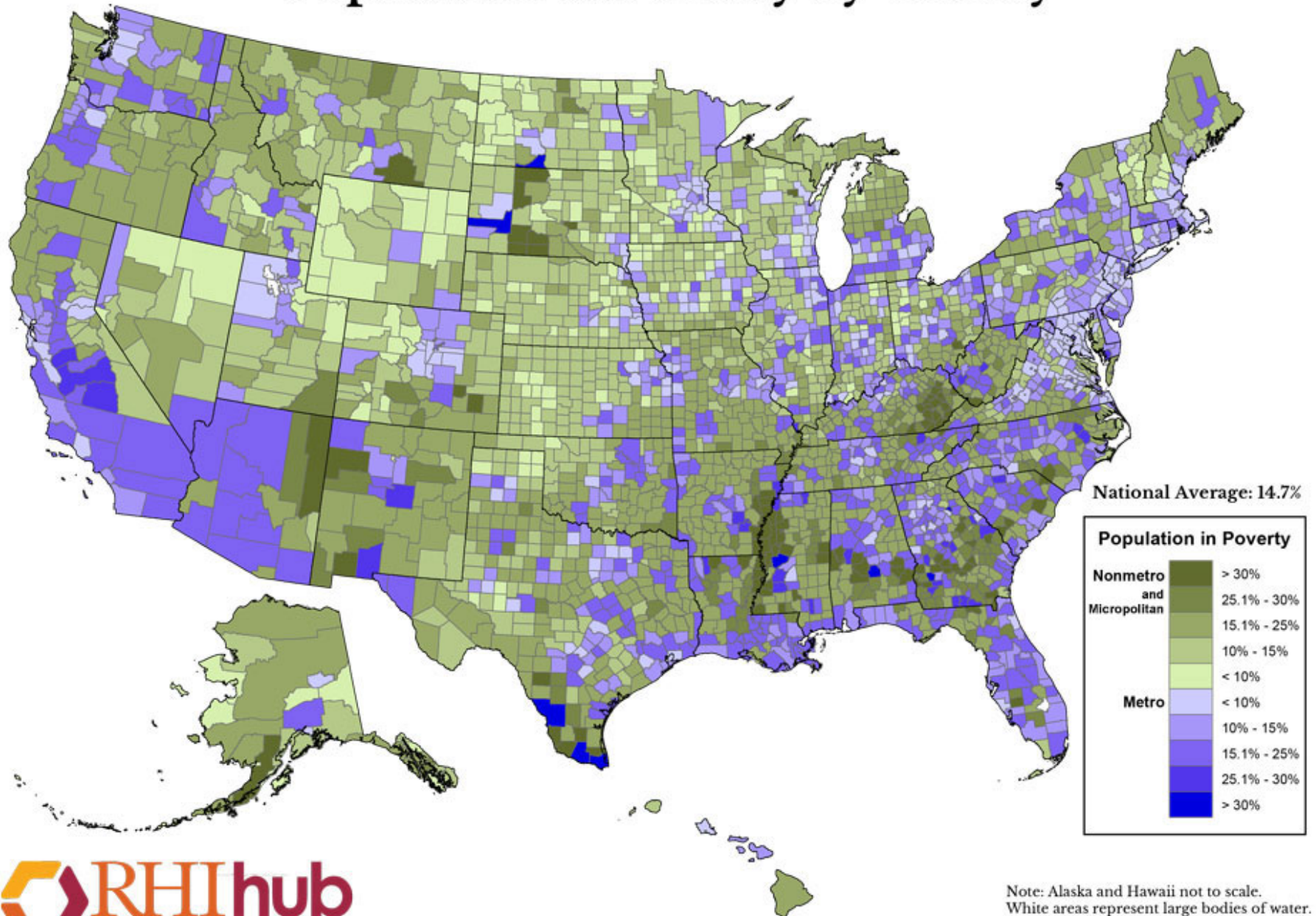


**Color: percent growth or decline**

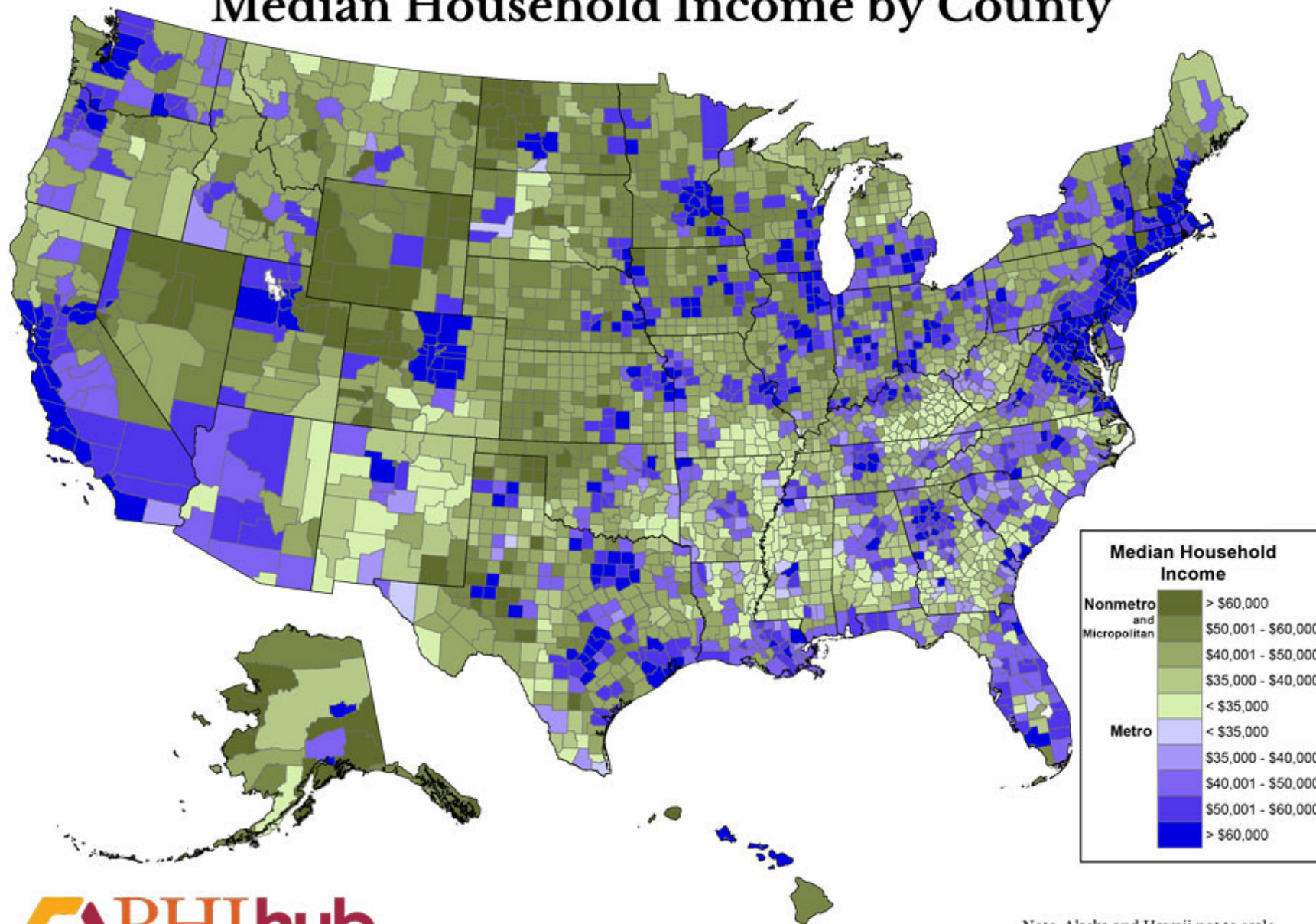




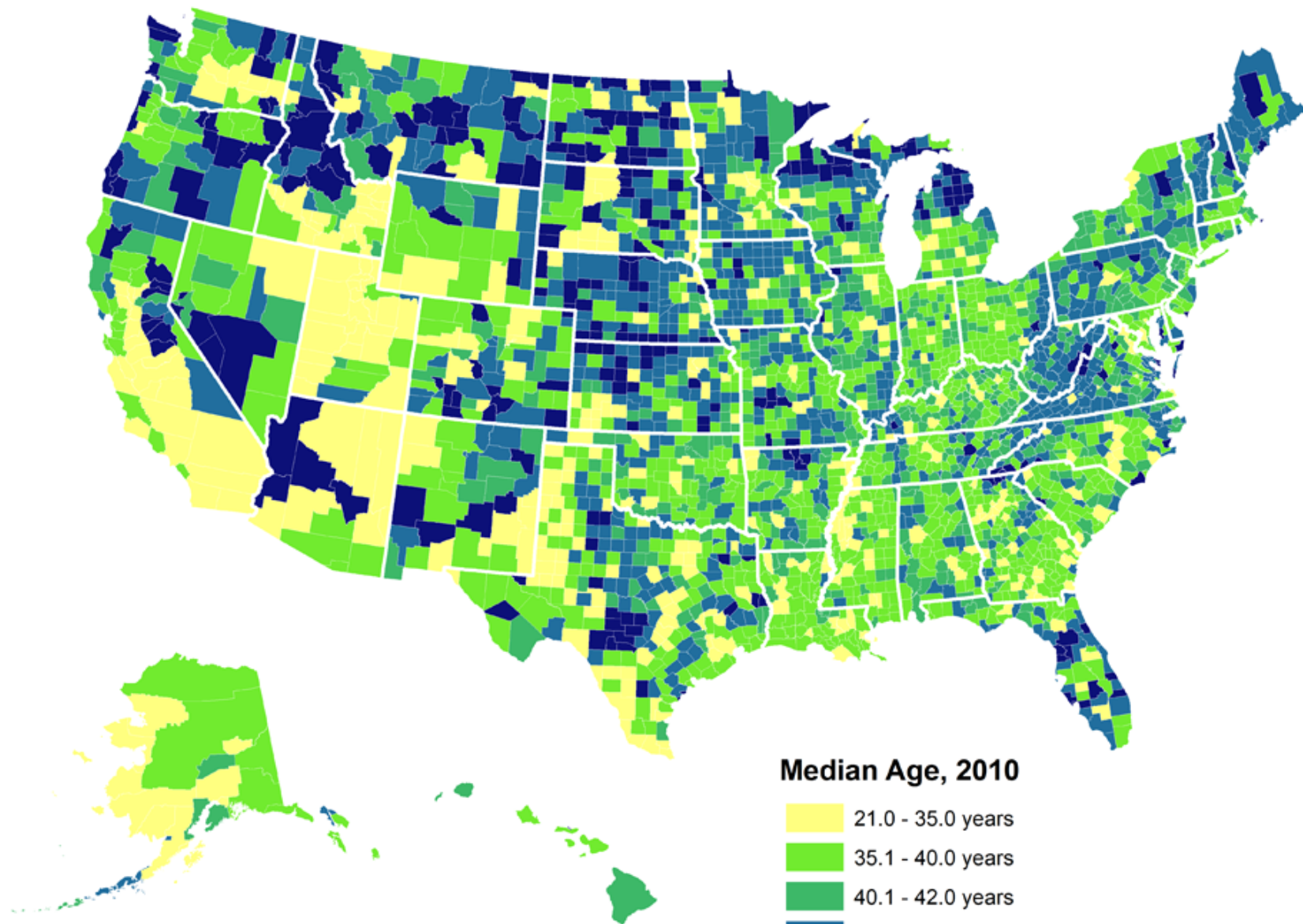
# Population in Poverty by County



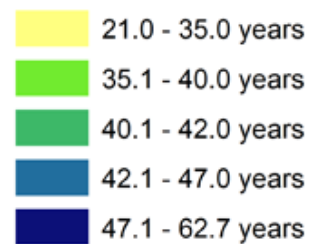
# Median Household Income by County

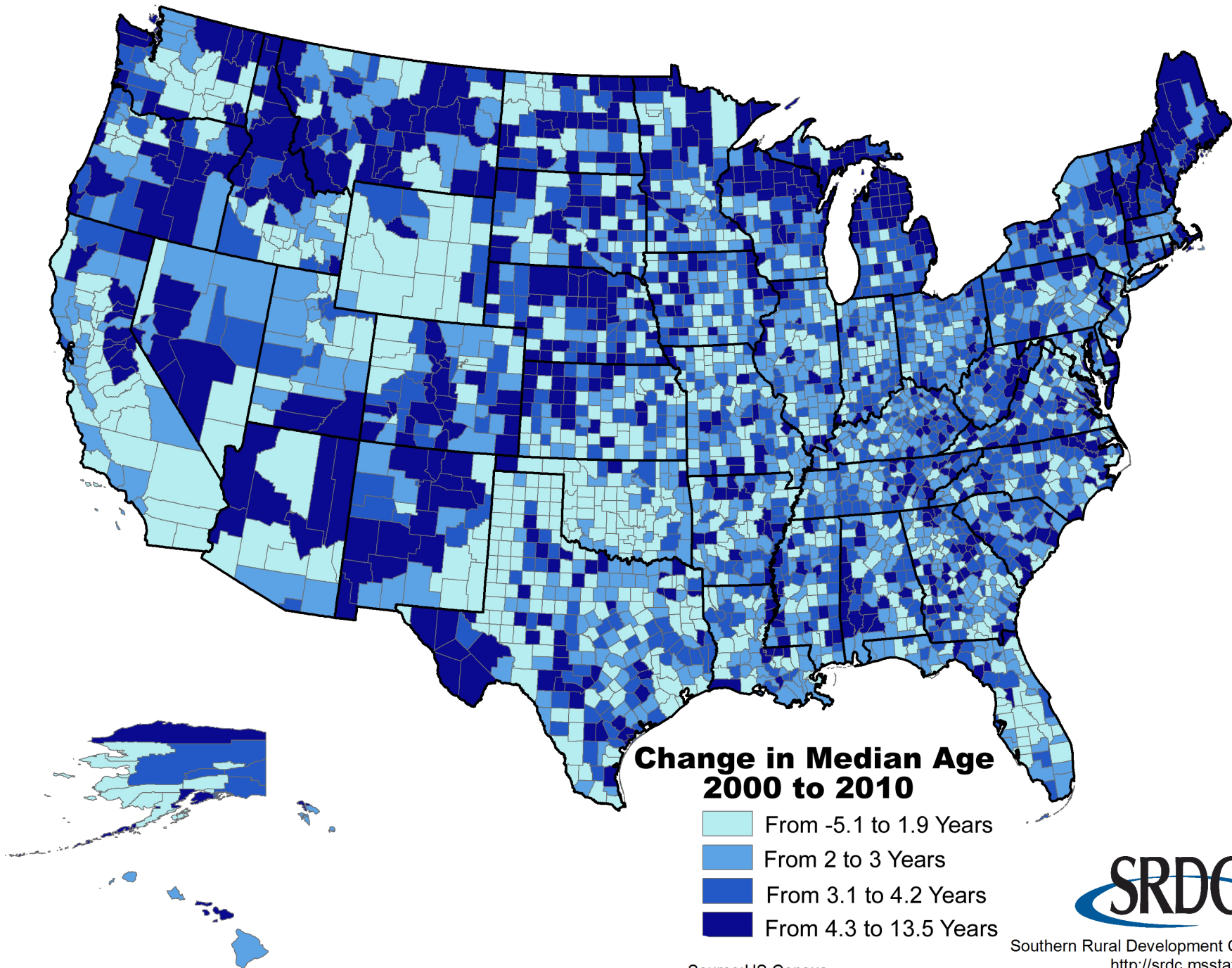






**Median Age, 2010**





Source: US Census



Southern Rural Development Center  
<http://srdc.msstate.edu>  
Created: 03/2012

A blue-tinted photograph of industrial machinery, possibly a water treatment plant, featuring large pipes and mechanical components.

# Challenges of Demographics

## Oversimplifications:

Fast population loss makes most things challenging

- Households pay water bills

Slow population decline can be manageable

- Must recognize & plan

Low income/high poverty challenge ability to reinvest

Aging population:

- Difficult to fill workforce
- More stable income?



# Challenges of Management

## Managerial Capacity

- Struggle in small systems
- “Too many hats”
- Lack of knowledge/skills
- Lack volume pricing
- Not familiar with capital project management





# Management Challenges

May be unable to:

- Issue bonds
- Obtain financing
- Keep up with required sampling

Few customers to spread costs of:

- Engineering
- Outside services
- Testing
- Software
- Operator & clerk salaries



# Solving Management Challenges

Take stock of current position

- What does your system do well?
- What are you lacking?
- Where do you fall short in the future?

Generally:

- Partner
- Outsource
- Consolidate/merger



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**Thank you for participating today, and we  
hope to see you at a future workshop!**

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