## Federal Water Regulation

Water federalism and regulation in the U.S.

<table>
<thead>
<tr>
<th></th>
<th>Water quality</th>
<th>Water quantity</th>
<th>Water funding</th>
<th>Water prices</th>
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<tbody>
<tr>
<td>Federal</td>
<td>Congress and EPA</td>
<td>Court review as applicable</td>
<td>Congress and EPA</td>
<td>Judicial review</td>
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<td>Interstate</td>
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<td>States</td>
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<td><strong>Resource agencies</strong></td>
<td><strong>Revolving loan funds (SRF)</strong></td>
<td><strong>PUCs and/or judicial review</strong></td>
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<tr>
<td>States</td>
<td>(health &amp; environmental)</td>
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<tr>
<td>Substate</td>
<td>Management districts (varies)</td>
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<td>Local</td>
<td>Local health departments</td>
<td>Local zoning and fire officials (pressure)</td>
<td>Local financing (bonds)</td>
<td>Municipal and other local boards</td>
</tr>
</tbody>
</table>
Federal water-quality legislation and goals

Clean Water Act
Achieving “fishable and swimmable waters” through pollution control, wastewater treatment, and stormwater management

Safe Drinking Water Act
Achieving a quality of drinking water that is as close as feasible to where there will be no known or anticipated adverse impacts on human health with an adequate margin of safety.

Clean Water Act (1972)

- “The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
- The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972.
- "Clean Water Act" became the Act’s common name with amendments in 1972.
- Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry. We have also set water quality standards for all contaminants in surface waters.
- The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. EPA's National Pollutant Discharge Elimination System (NPDES) permit program controls discharges. Point sources are discrete conveyances such as pipes or man-made ditches.
- Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters” (http://www2.epa.gov/laws-regulations/summary-clean-water-act)
Clean Water Act summary

- Jointly developed by the US EPA and US Army Corps of Engineers
  - Thirteen states are exempt: Alaska, Arizona, Arkansas, Colorado, Idaho, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota and Wyoming.
  - “The rule ensures that waters protected under the Clean Water Act are more precisely defined and predictably determined, making permitting less costly, easier, and faster for businesses and industry. The rule is grounded in law and the latest science, and is shaped by public input. The rule does not create any new permitting requirements for agriculture and maintains all previous exemptions and exclusions.”

- According to the EPA and Army, the rule:
  - Clearly defines and protects tributaries that impact the health of downstream waters
  - Provides certainty in how far safeguards extend to nearby waters
  - Protects the nation’s regional water treasures
  - Focuses on streams, not ditches
  - Maintains the status of waters within Municipal Separate Storm Sewer Systems
  - Reduces the use of case-specific analysis of waters

Clean Water Rule (2015, currently under judicial stay)

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  - Thirteen states are exempt: Alaska, Arizona, Arkansas, Colorado, Idaho, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota and Wyoming.
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Early history of drinking water and public health

State and county programs emerged
Filtration in Philadelphia
Large-scale chlorination

Early 1900s
1906
1908

Early success in drinking-water protection

Death Rates for Typhoid Fever in the USA
Chlorination begins

Rates per 100,000 Population
Rates per 1,000,000 Population

1900 1910 1920 1930 1940 1950 1960
Early state regulation (Montana)

Montana public water supply statute

Statute weakened

Statute revised to original form

1907 1911 1915

Emerging federal role and the USEPA

- **Public Health Service (1912)**
  - Formerly the Public Health and Marine Hospital Service
  - Broadened power to investigate human diseases (such as tuberculosis, hookworm, malaria, and leprosy), sanitation, water supplies, and sewerage disposal

- **Indian Health Service (1956)**
  - Water and wastewater facilities

- **Federal statutes that lacked enforcement authority**
  - Water Pollution Control Act of 1948
  - Federal Water Pollution Control Act of 1956
  - Water Quality Act of 1965

- **U.S. Environmental Protection Agency**
  - Established under the Nixon administration on December 2, 1970
  - Consolidated under one agency federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection
Evolution of drinking water regulation

- USPHS survey of community water systems (1969)
- Many especially smaller systems were not complying with PHS standards
- Organic chemicals found in New Orleans finished water (1972)
- Epidemiology study linking drinking water to cancer in New Orleans (1974)
- Reauthorization linked to public health crises (giardia, cryptosporidium)

Continuing challenge of water contamination (CDC)

- Opportunistic pathogens (OPs) in aging and sluggish distribution systems and premise plumbing are a growing concern
Drinking water regulation

- Equal protection under uniform preventive and protective standards informed by public-health and environmental science
- Multiple barriers to contamination and a professionalized culture of compliance
- While there is no “right” to drinking water, there is an obligation of systems to deliver compliant water
- Compliance is not discretionary, regardless of structural or fiscal conditions
- Variances and exemptions are narrow, uncommon (MI reported none in 2014)

Safe Drinking Water Act (SDWA) and core principles

- SDWA is democratically established federal law (1974, 1986, 1996)

  - **Safe Drinking Water Act (SDWA) of 1974**
    - Authorizes EPA to promulgate National Primary Drinking Water Regulations
    - Established the public water system supervision (PWSS), underground injection control (UIC), and sole source aquifer (SSA) program
    - Established the 15-member National Drinking Water Advisory Council (NDWAC) to support EPA with regard to the drinking water program
    - Provided for state primacy in implementation and enforcement
    - State laws may mirror federal law and may be more but not less stringent

  - **Goals under the act are meant to achieve a level of drinking water quality as close as feasible to that at which there are no known or anticipated adverse impacts to human health including an adequate margin of safety**
Regulatory chain of command

EPA emergency powers (§1431)

(a) Actions authorized against imminent and substantial endangerment to health. Notwithstanding any other provision of this subchapter the Administrator, upon receipt of information that a contaminant which is present in or is likely to enter a public water system or an underground source of drinking water, or that there is a threatened or potential terrorist attack (or other intentional act designed to disrupt the provision of safe drinking water or to impact adversely the safety of drinking water supplied to communities and individuals), which may present an imminent and substantial endangerment to the health of persons, and that appropriate State and local authorities have not acted to protect the health of such persons, may take such actions as he may deem necessary in order to protect the health of such persons. To the extent he determines it to be practicable in light of such imminent endangerment, he shall consult with the State and local authorities in order to confirm the correctness of the information on which action proposed to be taken under this subsection is based and to ascertain the action which such authorities are or will be taking. The action which the Administrator may take may include (but shall not be limited to) (1) issuing such orders as may be necessary to protect the health of persons who are or may be users of such system (including travelers), including orders requiring the provision of alternative water supplies by persons who caused or contributed to the endangerment, and (2) commencing a civil action for appropriate relief, including a restraining order or permanent or temporary injunction.

(b) Penalties for violations; separate offenses. Any person who violates or fails or refuses to comply with any order issued by the Administrator under subsection (a)(1) of this section may, in an action brought in the appropriate United States district court to enforce such order, be subject to a civil penalty of not to exceed $15,000 for each day in which such violation occurs or failure to comply continues.
Multiple barriers and standards

- **States and EPA had different approaches**
  - State approaches came from public health programs

- **State multiple-barrier approach**
  - Source selection and protection, treatment, and distribution
  - Plans and specifications for water systems
  - Sanitary surveys and training

- **EPA standards approach**
  - Establish standards
  - Monitor for compliance with standards
  - Enforce against those who do not comply

- **U.S. regulatory regime today**
  - Active identification of jurisdictional systems
  - Robust regulatory standards for drinking water quality
  - A complementary incentive-based suite of protection programs based on multiple barriers
    - Source water assessment and protection
    - Qualified water treatment operators
    - Integrity of water distribution systems
    - Informed public (notice, CCR)

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1976 Public Water System Supervision (PWSS)

- Since 1976 EPA has annually received a Congressional appropriation under §1443(a) of the SDWA to assist states, territories, and tribes in carrying out their PWSS programs

- Entities that have been delegated primary enforcement responsibility (primacy) by EPA for the PWSS program are eligible to receive grants

- PWSS evolved to support standard-setting, monitoring, enforcement, preventive action

- **Key activities carried out under a PWSS program include:**
  - Developing and maintaining state drinking water regulations;
  - Developing and maintaining an inventory of public water systems throughout the state;
  - Developing and maintaining a database to hold compliance information on public water systems;
  - Conducting sanitary surveys of public water systems;
  - Reviewing public water system plans and specifications;
  - Providing technical assistance to managers and operators of public water systems;
  - Carrying out a program to ensure that the public water systems regularly inform their consumers about the quality of the water that they are providing;
  - Certifying laboratories that can perform the analysis of drinking water that will be used to determine compliance with the regulations; and
  - Carrying out an enforcement program to ensure that the public water systems comply with all of the state’s requirements.
1986 SDWA Amendments

- Prescriptive approach
- Tight deadlines
- Eighty-three (83) contaminants in three years
- Additional 25 contaminants every 5 years
- Added ground water protection programs (wellhead protection)
- Creation of the NTNC category of water system
- Organic chemicals (monitoring and detection, risk communication)
- Surface water treatment rule
- Ground water under the direct influence (of surface water) – GWUDI
- Public notification
- More stringent coliform monitoring requirements
- Lead and copper rule and corrosion control

1996 SDWA Amendments

- Reflected federal incorporation of preventive programs
  - Some states had focused on multiple barrier protection since the early 1900’s
  - 1974 and 1986 Amendments focused on regulation, monitoring, and enforcement
  - With the 1996 Amendments, Congress recognized that the public health protection objectives of SDWA required a broader set of tools to accomplish goals
- Drinking Water State Revolving Fund (DWSRF)
  - National set-aside for monitoring of unregulated contaminants.
  - State set-asides to fund source water protection, operator certification, and capacity development
- Capacity development to proactively address system compliance concerns
  - New and existing systems
  - Funding incentives under the DWSRF
EPA classification of public water systems

- Public water systems (public or private) subject to EPA jurisdiction
  - Community water systems
  - Noncommunity water systems
    - Transient population
    - Nontransient population

Types of public water systems (continued)

- **Public water system**
  - Provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year
  - May be publicly or privately owned

- **Community water system**
  - Serves the same people all year
    - Public: mostly municipalities but also governmental districts and authorities
    - Private: for-profit; nonprofit; ancillary, including homeowners’ associations

- **Non-transient non-community system**
  - Serves same 25 people at least 6 months/year (but not year-round)
  - Schools, factories, office buildings, hospitals.

- **Transient non-community system**
  - Serves different people
    - Gas stations, parks, resorts, campgrounds, restaurants, and motels
U.S. industry structure (2011):
51,356 community water systems served almost 300 mil. people

EPA regulations

- **National Primary Drinking Water Regulation** – legally enforceable standards
  - Limits levels of specific contaminants that can adversely affect public health
  - Maximum Contaminant Level (MCL) or Treatment Technique (TT)

- **National Secondary Drinking Water Regulation** – non-enforceable guidelines
  - Covers contaminants that may cause cosmetic or aesthetic effects

- **Maximum Contaminant Level Goal (MCLG)** – non-enforceable goals
  - § 1412(b)(4)(A): “…level at which no known or anticipated adverse effects…occur and which allows for an adequate margin of safety.”

- **Maximum Contaminant Level (MCL)** – enforceable
  - § 1412(b)(4)(B): “level… as close to the maximum contaminant level goal as is feasible.”

- **Treatment Technique** – enforceable based
  - § 1412(b)(7): “…in lieu of establishing a maximum contaminant level, if…it is not economically or technologically feasible to ascertain the level of the contaminant.”
From risk to rule

Regulatory framework and rules

- **Microbial contaminants**
  - Bacteria, viruses, and protozoa (e.g., Cryptosporidium, Giardia, especially from fecal sources)
    - Aircraft drinking water
    - Ground water
    - Surface water treatment
    - Total coliform rule (revised rules)

- **Chemical, metal, and radiological contaminants**
  - Toxins, neurotoxins, endocrine disrupters, etc.
  - Naturally occurring chemicals
    - Arsenic
    - Lead and copper
    - Radionuclides
  - Manmade chemicals
    - Chlordane and dioxin
    - Volatile and synthetic organic chemicals (VOCs and SOCs)
    - Inorganic chemicals (IOCs)

- **Disinfectants and disinfection byproducts (Stage 1 and 2)**
  - Based on increased risks of cancer and reproductive and developmental effects
  - Trihalomethanes and haloacetic acids

- **Contaminant candidate listing**
  - Chemicals used in commerce, pesticides, biological toxins, disinfection byproducts, pharmaceuticals, and waterborne pathogens
  - Formal determination of need for regulation every five years
Regulatory framework and rules (continued)

- **Monitoring and reporting**
  - Regulated and unregulated contaminants

- **Public information and notice**
  - Consumer confidence report rule
  - Public notification rule

- **System capacity and planning**
  - Operator certification guidelines
  - Capacity development programs for new and existing systems
  - Voluntary conservation planning guidelines
  - Information and guidance to states and systems (affordability, cross-connection control)

- **Funding and incentives**
  - Drinking Water State Revolving Loan Fund (DWSRF)
  - Restructuring provisions related to funding, capacity, and variances

- **Variances and exemptions**
  - For systems unable to comply with a NPDWR due to their source water quality when no feasible alternate source of water is available
  - For small systems serving 3,300 persons or fewer that cannot afford to comply with a NPDWR or systems serving up to 10,000 persons on a case-by-case basis
  - No variances for microbial contaminants based on size

- **Six-year regulatory review**
  - Ensures that standards remain as protective as feasible by considering new health effects data that suggest the need for stronger standards as well as any advances in treatment technology

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Contaminant evaluation

- **Adverse health effects**
  - Acute exposure from pathogens and nitrates (especially infants)
  - Chronic exposure over time
  - Exposure during critical periods of development

- **Carcinogenicity**
  - Category I compounds are carcinogens
  - Category II compounds exhibit carcinogenic & noncarcinogenic endpoints
  - Category III compounds are noncarcinogenic

- **Sensitive sub-populations**
  - Infants and children
  - Elderly people
  - Immuno-compromised individuals
  - Highly exposed individuals

- **National Contaminant Occurrence Database**
  - Contaminant occurrence data for finished, untreated, and source waters
  - Information is from SDWIS and NWIS
Key steps in developing drinking water regulations

- Evaluate contaminant occurrence and exposure
- Set the maximum contaminant level goal (MCLG)
- Develop standard (MCL) and (TT) alternatives
  - Evaluate the costs and benefits (quantifiable and unquantifiable) and uncertainties
  - Document support for the proposed or final rule in an Economic Analysis and other technical analyses (health criteria document; occurrence and exposure document; cost and technology document)
- Set the maximum contaminant level (MCL)
  - An MCL is an enforceable standard set as close to the MCLG as feasible
  - SDWA provides guidance on the meaning of feasible in §1412(b)(4)(E)
  - Requires a determination as to whether the benefits justify the costs
- Specify a treatment technique (TT)
  - Alternative to MCL when it is not economically & technologically feasible to ascertain the contaminant level
  - An enforceable standard involving a measurable procedure or level of technological performance
  - Exceeding an “action level” (AL) triggers treatment technique and notification
  - Includes:
    - Surface Water Treatment Rule (disinfection and filtration)
    - Lead and Copper Rule (MCLG = 0; no MCL; requires optimized corrosion control)
    - Acrylamide and Epichlorohydrin Rule (purity of treatment chemicals)
- Specify the best available technology (BAT) as appropriate

Benefit and cost analysis

- Prior to 1996, benefit-cost analysis informed decisions but was not incorporated into the rulemaking process
- 1996 SDWA Amendments added §1412(b)(6)
  - “...if the Administrator determines... that the benefits of a maximum contaminant level... would not justify the costs of complying with the level, the Administrator may, after notice and opportunity for public comment, promulgate a maximum contaminant level that maximizes health risk reduction benefits at a cost that is justified by the benefits.”
- Regardless of whether it’s an MCL or a treatment technique, the information gathering and analytical processes are similar
- Cost of compliance
  - Capital costs for installing treatment
  - Operation and maintenance (O&M) costs for the treatment
  - Monitoring and reporting costs
  - Administrative costs to systems, States, and EPA
Quantifying benefits of reducing health risks

- Occurrence and exposure information
  - Reduced exposure

- Dose-response information
  - Deaths or disease avoided

- Monetization of “cases avoided”

- Monetary ($) value = benefits

- Nonquantifiable benefits must also be considered
  - Benefits of avoided health effects that can’t be measured
  - Cost savings associated with the removal of other contaminants
  - Gaining economies of scale by merging with other water systems

Consumer confidence reporting

<table>
<thead>
<tr>
<th>Genesee County Water and Waste Services Detected Contaminants Tables</th>
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<tbody>
<tr>
<td><strong>Registered Contaminant</strong></td>
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<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Phosphate</td>
</tr>
<tr>
<td>Nitrate</td>
</tr>
<tr>
<td>Barium</td>
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**Disinfectant By-Product Monitoring in Distribution System**

<table>
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<tr>
<th><strong>Contaminant</strong></th>
<th><strong>Test Date</strong></th>
<th><strong>Units</strong></th>
<th><strong>Health Goal</strong>, MCLG</th>
<th><strong>Acceptable Level</strong>, MCL</th>
<th><strong>Highest Detected</strong>, Range of Detection</th>
<th><strong>Violations</strong></th>
<th><strong>Major Source in Drinking Water</strong></th>
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</thead>
<tbody>
<tr>
<td>Total Coliform Bacteria</td>
<td>11/30/2017</td>
<td>ppm</td>
<td>0</td>
<td>0</td>
<td>0, No</td>
<td></td>
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</tr>
<tr>
<td>E. coli or Fecal coliform bacteria</td>
<td>04/06/2017</td>
<td>ppm</td>
<td>0</td>
<td>0</td>
<td>0, No</td>
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</table>

**Sodium (ions)**

<table>
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<tr>
<th><strong>Final Action</strong></th>
<th><strong>Number of Samples</strong></th>
<th><strong>Number of Samples Exceeding AL</strong></th>
<th><strong>Action Level - 106</strong></th>
<th><strong>Violations</strong></th>
<th><strong>Major Source in Drinking Water</strong></th>
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<tbody>
<tr>
<td>Earth's natural deposits</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</table>

**2015 Microbiological Contaminants - Monthly Monitoring in Distribution System**

<table>
<thead>
<tr>
<th><strong>Genesee County Lead and Copper Results</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Contaminants</strong></td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Lead</td>
</tr>
<tr>
<td>Copper</td>
</tr>
</tbody>
</table>
Enforcement action and public notice

1996 SDWA and restructuring: key provisions

- Capacity assurance for water systems—technical, managerial, financial (§1420)
  - Demanding state requirements (e.g., plans) have slowed formation of new systems
  - Capacity development strategies for existing systems

- Consolidation Incentive - Enforcement (§1455)

- Variances (§1415)

- Exemptions (§1416)

- State Revolving Fund (§1452)

- Research (§1420)

- Despite some focus on the structural character of the industry (community v. noncommunity, transience, and size) the federal government is indifferent about ownership (public v. private)
Capacity development and SRF incentives

- From “mobilization,” to “viability assessment,” to “capacity development”
- Goals of capacity development
  - To ensure consistent compliance with drinking water standards
  - To enhance water system performance
  - To promote continuous improvement
- No State Revolving Fund (SRF) loans to systems that do not have adequate capacity, unless funding will improve capacity
  - Ensures that public funds are well invested and help leverage capacity development

Capacity development requirements

- Requirements for new water systems
  - States must ensure that all new community and nontransient noncommunity water systems demonstrate technical, managerial & financial capacity for compliance prior to start-up
  - Various state agencies may review applications
- Requirements for existing water systems
  - States must develop and implement a strategy to assist existing public water systems in acquiring and maintaining technical, managerial, and financial capacity, including
    - Methods or criteria to identify systems and prioritize need
    - Factors that encourage or impede capacity development
    - Authority and resources to:
      - Provide assistance for compliance
      - Encourage partnerships
      - Promote training and certification
What is capacity?

- Water system capacity is the ability to plan for, achieve, and maintain compliance with applicable drinking water standards
- As noted, capacity development also extends beyond compliance
- For a system to have “capacity” it must have “adequate” capability in three areas—technical, managerial, and financial
- Each element is necessary but not sufficient.
- Many water system functions involve more than one capacity element
- Monitoring, assessment, and planning can address all three elements of capacity

<table>
<thead>
<tr>
<th>System has capacity</th>
<th>System lacks capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Files complete and timely reports</td>
<td>Does not answer the phone or respond to contact</td>
</tr>
<tr>
<td>Follows standard operating procedures</td>
<td>Has an owners who is absent an uninvolved</td>
</tr>
<tr>
<td>Demonstrates pride of ownership</td>
<td>Does not maintain financial or operational records</td>
</tr>
<tr>
<td>Conducts effective board meetings</td>
<td>Cannot complete timely reports</td>
</tr>
<tr>
<td>Has a computer and software</td>
<td>Does not review or revise rates</td>
</tr>
<tr>
<td>Attends professional meetings</td>
<td>Cannot provide consistent service quality</td>
</tr>
<tr>
<td>Communicates well with customers</td>
<td>Experiences high water losses</td>
</tr>
<tr>
<td>Meters and bills for cost of service</td>
<td>Has a crumbling distribution infrastructure</td>
</tr>
</tbody>
</table>
1. Technical capacity

- The physical and operational ability of a water system to meet SDWA requirements, including the adequacy of physical infrastructure and the technical knowledge and capability of personnel.

- Elements
  - Source-water adequacy and protection
  - Infrastructure adequacy and improvement
  - Technical knowledge and implementation

2. Financial capacity

- The ability of a water system to acquire and manage sufficient financial resources to allow the system to achieve and maintain compliance with SDWA requirements.

- Elements
  - Revenue sufficiency
  - Credit worthiness
  - Fiscal controls
3. Managerial capacity

- The ability of a water system to conduct its affairs in a manner enabling the system to achieve and maintain compliance with SDWA requirements, including institutional and administrative capabilities.

- Elements
  - Ownership accountability
  - Staffing and organization
  - Effective external linkages

Responding to capacity needs

- Remedial – “Redress”
- Tactical – “Reassess”
- Operational – “Reengineer”
- Organizational – “Reorganize”
- Structural – “Restructure”
Role of water system planning

- Business plan
- Financial plan
- Management plan
- Water resource plan
- Contingency/emergency-response plan
- Capital facility plan
- Operation and maintenance plan
- Watershed plan
- Integrated resource plan
- Strategic plan

Planning as process

- Planning is a dynamic and ongoing process (continuous improvement)
- Planning encourages strategic thinking by managers on a day-to-day basis, with internalization of goals and commitment to a strategy for achieving them
- Planning requires continual assessment and adjustments to changes in the external environment
EPA’s four pillars of sustainable infrastructure

- Asset management
- Efficient use
- Watershed approaches
- Full-cost pricing

State public utility commission roles

- **Coordinated regulation**
  - Memoranda of understanding and informal communications
  - System identification and shared data
  - Drinking water SRF access

- **Incentives for consolidation**
  - Acquisition adjustments
  - Single-tariff pricing
  - Mandatory takeover authority

- **Small-system methods**
  - System of accounts
  - Simplified and flexible procedures
  - Cash needs and operating ratio ratemaking

- **Expansion of commission jurisdiction**
  - Water accounting, reporting, and full-cost pricing
EPA water websites

Resources on water

- Federal legislation
- US Environmental Protection Agency – Water
  - [http://water.epa.gov/drink/](http://water.epa.gov/drink/)
  - [http://cfpub.epa.gov/surf/locate/index.cfm](http://cfpub.epa.gov/surf/locate/index.cfm)
- USEPA Small Systems and Capacity Development
  - [http://www.epa.gov/safewater/smallsys.html](http://www.epa.gov/safewater/smallsys.html)
- AWWA Principles of Water Rates, Fees, and Charges (M1)
  - [http://www.awwa.org/bookstore/product.cfm?id=30001](http://www.awwa.org/bookstore/product.cfm?id=30001)
- International Water Resources Association (IWRA)
  - [http://www.iwra.siu.edu/](http://www.iwra.siu.edu/)
- American Works Association
  - [http://www.awwa.org/index.cfm?showLogin=N](http://www.awwa.org/index.cfm?showLogin=N)
- Water Research Foundation
  - [http://www.waterrf.org](http://www.waterrf.org)
- United States Geological Survey