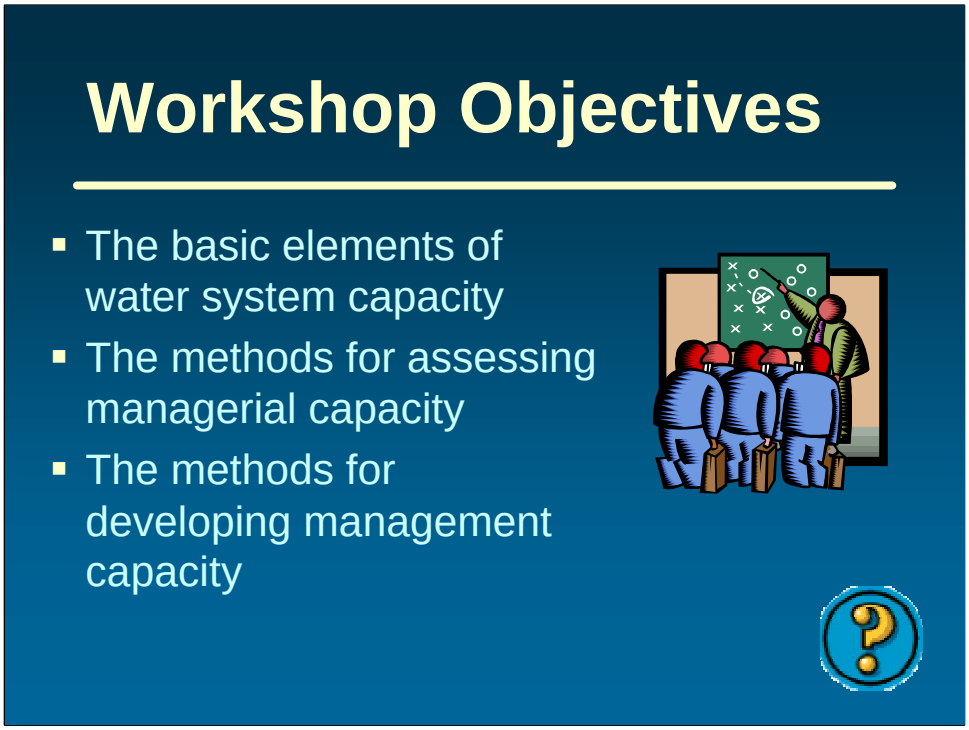
Developing Water System Managerial Capacity

- This training module was developed for the **Drinking Water Academy** (DWA) of the U.S. Environmental Protection Agency.
- The Academy is developing a number of **training modules.** These modules cover topics identified by the DWA Workgroup as most important in supporting SDWA implementation. The modules are being developed for new employees in particular.
- This module is **Developing Water System Managerial Capacity.**
- The purpose of this module is to provide a general **introduction and overview.** Additional information resources and training materials are available on many of the subjects reviewed in this module.



- The **purpose** of this presentation is to:
  - Review the **basic elements** of water-system capacity: technical, managerial, and financial;
  - Describe some of the available methods for **assessing** the managerial capacity of water systems; and
  - Explore various available methods for **developing** water system management capacity, including both nonstructural and structural options.
- Participants should discuss the **goals** they would like to achieve in the course of the workshop:
  - Background information;
  - Examples and illustrations;
  - Practical frameworks and tools;
  - Discussion and exchange of ideas; or
  - Sources for more information.
- Specific **topics or issues** can be identified and explored throughout the presentations.
- Ongoing **participation** in the workshop is encouraged.

Fundamental Goals of Capacity Development

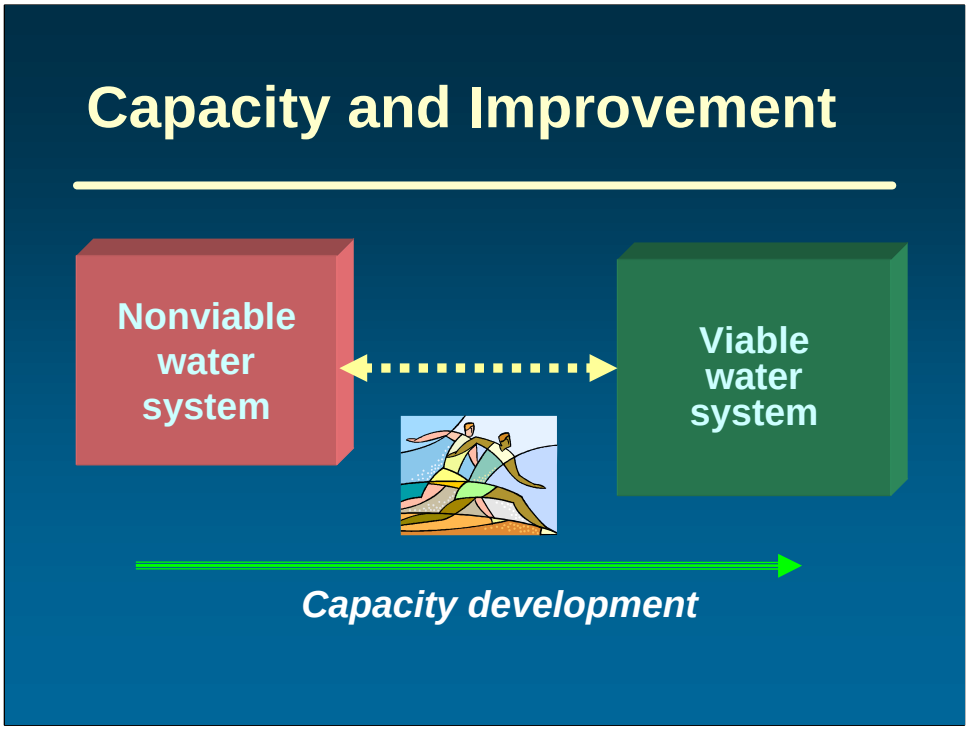
- To ensure consistent compliance with drinking water standards
- To enhance water system performance
- To promote continuous improvement

- The **1996 Safe Drinking Water Act** (SDWA) emphasizes developing the capacity of water systems.
- The **fundamental goals** of capacity development are:
  - To protect public health by **ensuring consistent compliance** with drinking water standards, including Federal and State regulations and other applicable standards of performance;
  - To **enhance performance** beyond compliance though measures that bring about efficiency, effectiveness, and service excellence; and
  - To **promote continuous improvement** through monitoring, assessment, and strategic planning. All water systems, regardless of size or other characteristics, can benefit from a program of continuous improvement.
- The basic premise of capacity development is that **capable water systems** are better positioned to consistently **comply** with applicable standards and provide customers with safe and reliable water service.
- Capable systems also are better positioned to meet other **standards** of performance that are generally accepted in the industry or required by other regulatory agencies; these may include the aesthetic quality of water (taste, color, and odor), water pressure, water losses, or other measurable aspects of performance.

Evolution

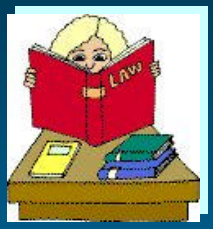
- Mobilization
  - Viability assessment
    - Capacity development

- The concept of capacity development **evolved** from earlier work by EPA and others on mobilization and viability assessment.
- **Mobilization** involved bringing various resources to bear on the challenges facing small water system.
- **Viability** assessment involved methods for determining whether a not a water system could be considered viable (or nonviable).
- **Capacity development** ensures compliance with applicable standards, while also enhancing performance and promoting continuous improvement.
- New concepts related to capacity development include **continuous improvement** and **sustainability.**



- Capacity development is related to the concept of water system **viability.**
  - However, viability sometimes suggests an overly simple **dichotomy** between nonviable and viable drinking water systems.
- Capacity development emphasizes the **continuous improvement** of water systems over time.
  - Capacity development is an **ongoing process,** not simply a result.
  - Capacity development strategies can improve long-term **sustainability.**

SDWA Requirements

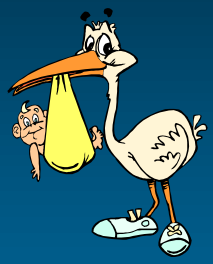


- Capacity assurance for *new* water systems (community and nontransient noncommunity)
- Capacity development for *existing water* systems
- SRF incentives to States and to water systems

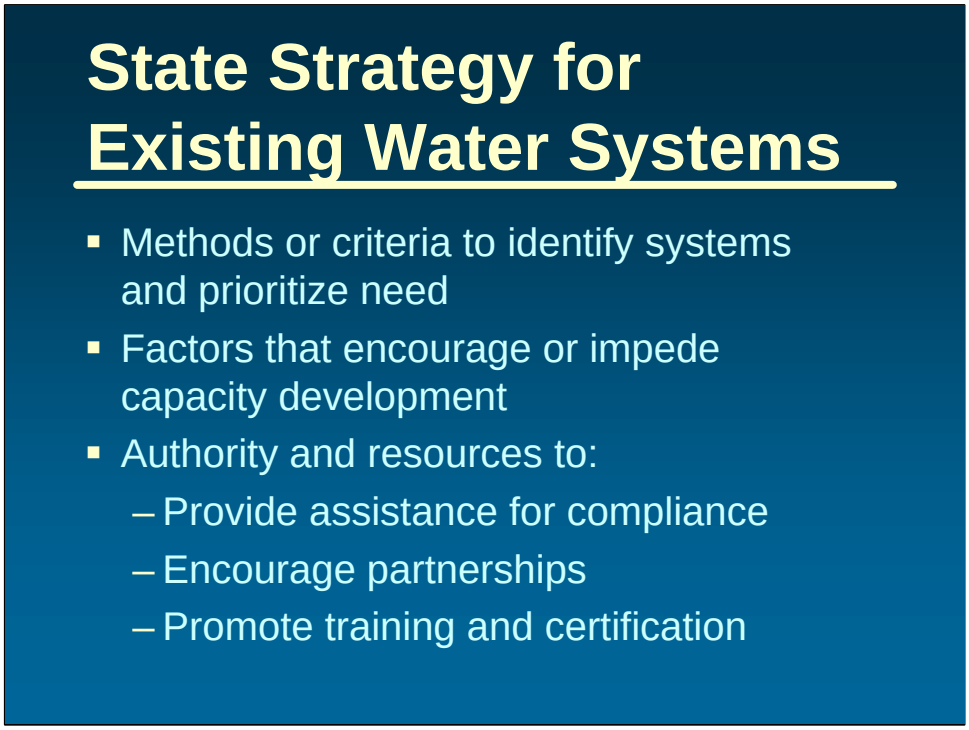
- The **Safe Drinking Water Act** (SDWA) contains capacity development provisions for new and existing water systems:
  - States much *ensure* that **new water systems** have adequate technical, managerial, and financial capacity. These procedures are now established in accordance with SDWA timelines.
  - States also must *develop* a **strategy** for improving the technical, managerial, and financial capacity of **existing systems.** These procedures are under development in accordance with SDWA timelines.
  - The Act also provides various **incentives** to States and to water systems in connection with capacity development.
  - These incentives (described later) are connected to **State Revolving Fund** (SRF) funding.

State Strategy for New Water Systems

- States must ensure that all new community water systems and noncommunity-nontransient water systems demonstrate technical, managerial and financial capacity for compliance prior to start-up



- To comply with the capacity development requirements for **new water systems,** States must ensure that all new community water systems and noncommunity-nontransient water systems demonstrate technical, managerial & financial capacity for compliance **prior to start-up.**
- **States** have adopted a number of approaches to capacity development for new systems.
- Many states use variations of a requirement that new systems develop a comprehensive and detailed **plan** for the proposed system.
- Various state agencies may be involved in **reviewing** new system applications.



- To comply with the capacity development requirements for **existing water systems,** State strategies must identify:
  - **Methods or criteria** to identify systems in need of capacity development and prioritize needs;
  - **Factors** that encourage or impede capacity development; and
  - **Authority and resources** to:
    - Provide assistance for compliance;
    - Encourage partnerships; and
    - Promote training and certification.

SRF Incentives for Capacity Development

- No SRF loans to systems that do not have adequate capacity, *unless* funding will:
  - Help the system achieve and maintain compliance, and
  - The system will make changes in operations to ensure capacity

- The **State Revolving Fund** (SRF) contains some specific incentives for capacity development.
  - **SRF loans** cannot be made to systems that do not have adequate technical, managerial, and financial capacity *unless* the funding will:
    - Help the system **achieve compliance**, and
    - The system will make changes in operations to **ensure capacity**.
- These provisions help ensure that the allocation of **public funds** to water systems via the SRF will be well invested and help leverage the process of capacity development.

SDWA Compliance and Managerial Capacity

- In addition to meeting standards for water quality, the SDWA requires:
  - Monitoring
  - Reporting
  - Consumer Confidence Report
- Compliance can be an indicator of managerial capacity

- The **Safe Drinking Water Act** (SDWA) requires water systems to meet various standards of water quality.
- SDWA compliance is a significant indicator of **managerial capacity,** particularly in terms of:
  - Monitoring
  - Reporting
  - Consumer Confidence Report
- Compliance with these requirements can be a useful indicator of **managerial capacity.**

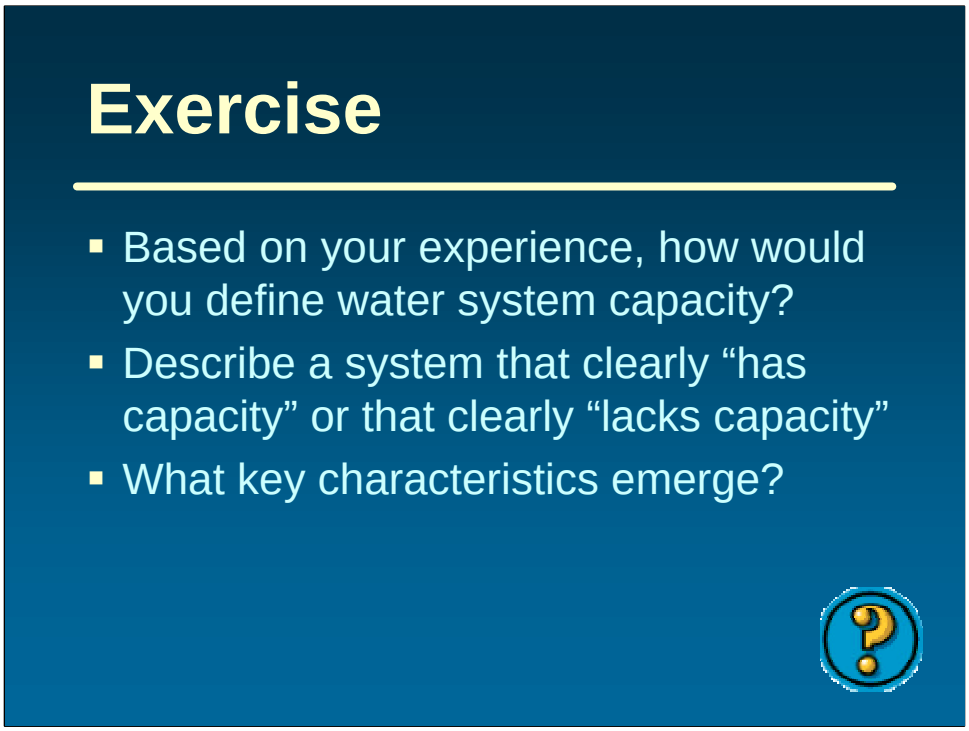
Defining Capacity

- Defining Capacity

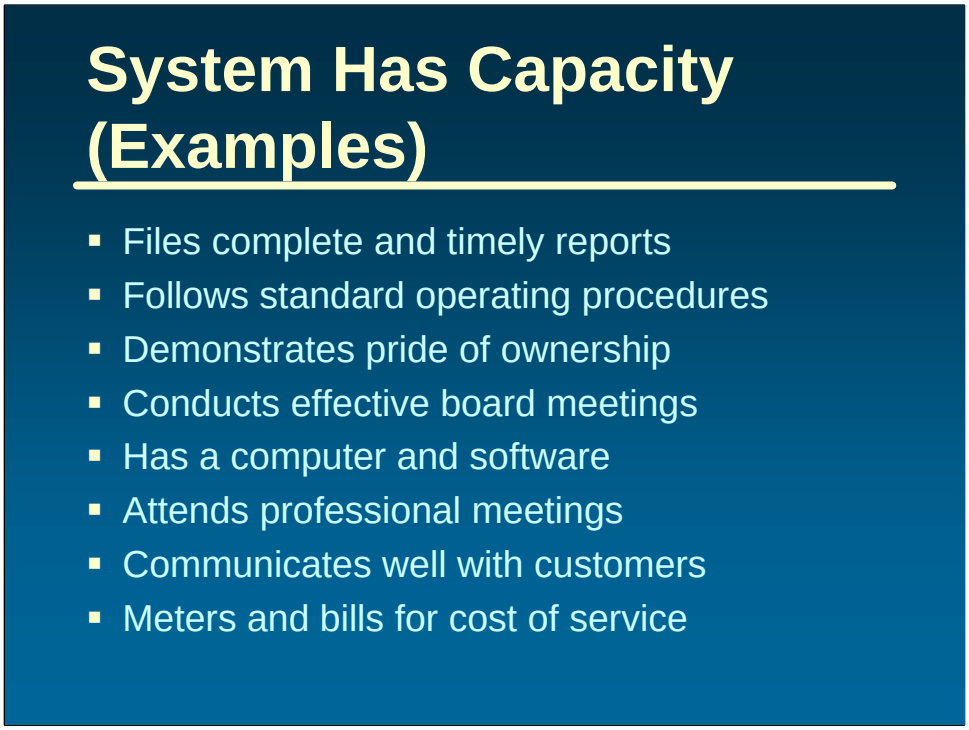
Case Study

- A small water system experiences frequent outages due to a faulty pump
- The outages do not (for the most part) present a technical compliance issue
- When outages occur, customers call “Margie,” who responds politely and quickly gets the pump going again
- Does the system have adequate capacity?

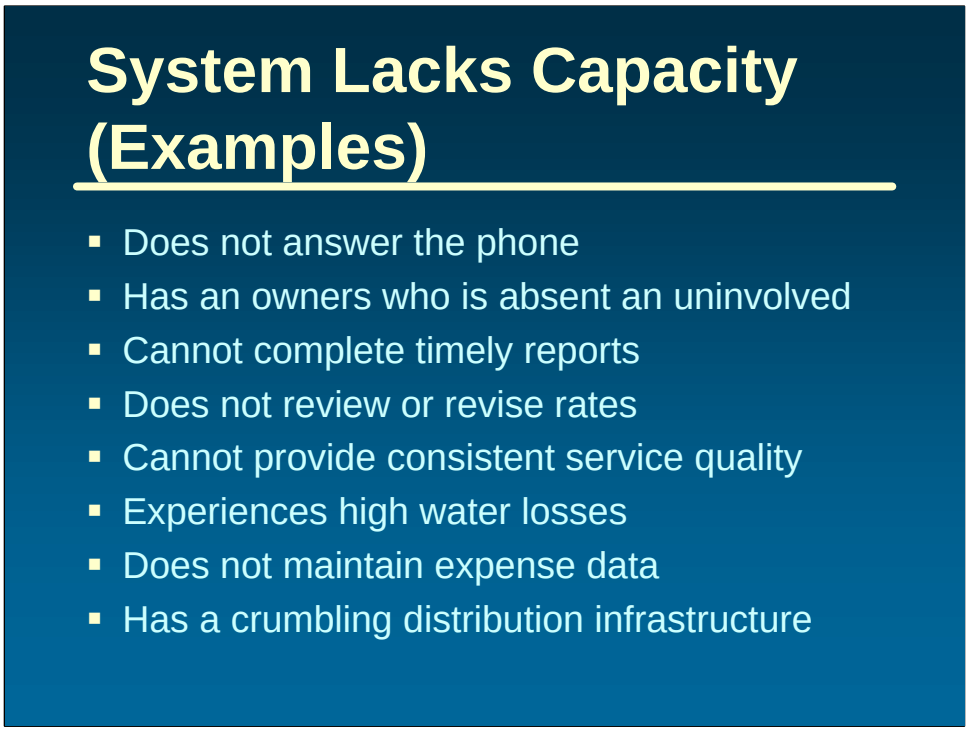
- Assessing capacity for some systems can be **puzzling.** For example:
  - Consider a small water system that experiences frequent outages due to a faulty pump.
  - The outages do not present a technical compliance issue.
  - When outages occur, customers call “Margie,” who responds politely and immediately and gets the pump going again.
  - Does the system have adequate capacity?



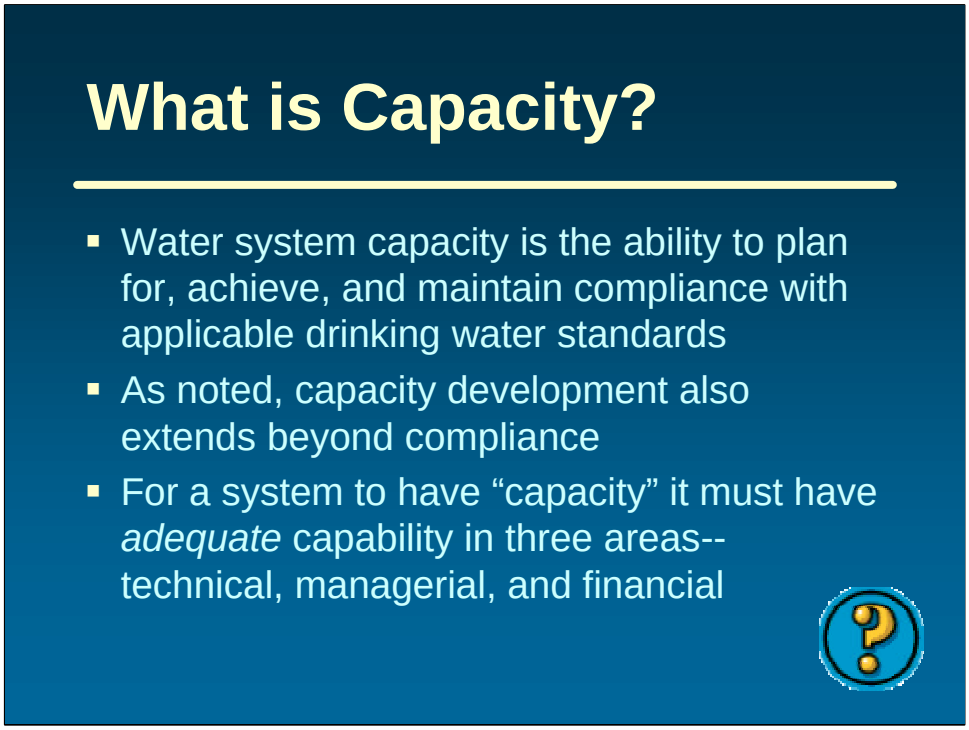
- Here is an **exercise** for defining capacity in practical terms.
- Participants in the workshop can provide their practical or working **definition** of capacity.
  - How do we know a seriously troubled system when we see one?
  - How do we identify systems that are “at risk” in terms of capacity?
- **Describe** a system that clearly “has capacity” or (conversely) “lacks capacity.”
  - List common characteristics and issues.
- Most characteristics related to capacity can be stated **positively** (e.g., keeps good records) and **negatively** (e.g., neglects record keeping).



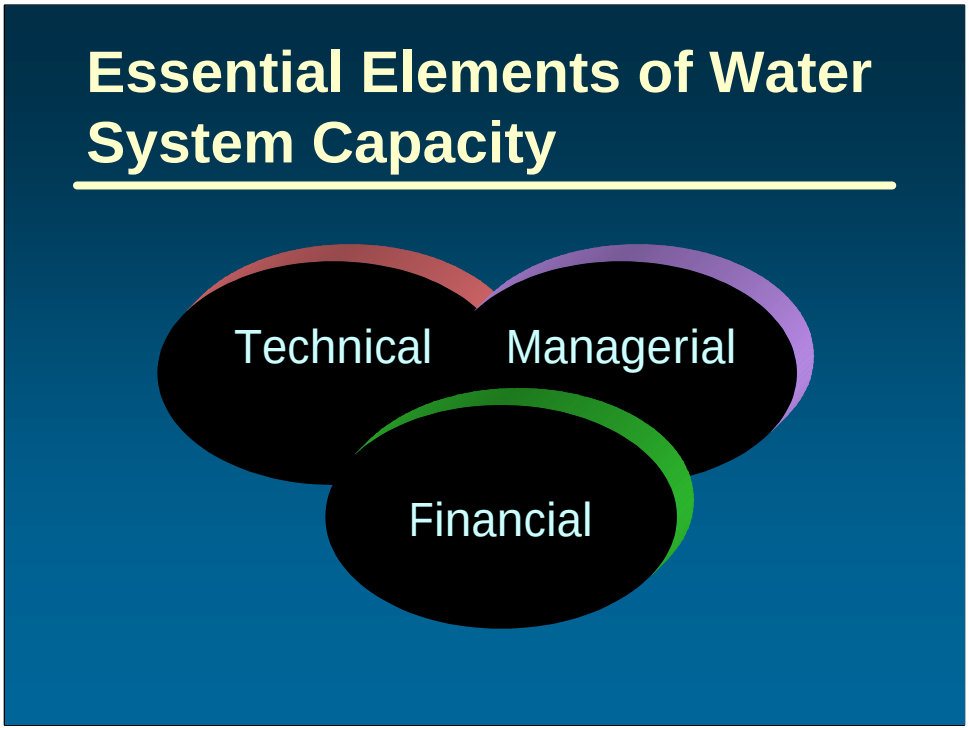
- Example characteristics of systems that **have capacity:**
  - Files complete and timely reports
  - Follows standard operating procedures
  - Demonstrates pride of ownership
  - Conducts effective board meetings
  - Has a computer and software
  - Attends professional meetings
  - Communicates well with customers
  - Meters and bills for cost of service



- Example characteristics of systems that **lack capacity:**
  - Does not answer the phone
  - Has an owner who is absent an uninvolved
  - Cannot complete timely reports
  - Does not review or revise rates
  - Cannot provide consistent service quality
  - Experiences high water losses
  - Does not maintain expense data
  - Has a crumbling distribution infrastructure



- Water system **capacity** (not to be confused with production capacity as measured in units of water) is:
  - The ability to plan for, achieve, and maintain compliance with applicable drinking water standards.
- As already noted, capacity development extends **beyond compliance** to include activities that enhance water system performance and promote continuous improvement.
- For a system to have capacity, adequate capability is required in **three** distinct but interrelated areas:
  - Technical;
  - Managerial; and
  - Financial.
- The **three basic elements** of capacity have a statutory basis. Definitions and refinements were developed in EPA guidance documents with the broad-based input of stakeholders.
- Participants may want to discuss the meaning of **"adequate."**



- Three **three essential elements** of capacity--technical, managerial, and financial, are closely related and can be represented by a “Venn diagram” depicting the intersections among the elements.

How They Relate

- Each capacity element--technical, managerial, and financial--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

- Water system capacity has been depicted as a **"three-legged stool"** because each capacity element--technical, managerial, and financial--is essential.
- Each element of capacity, in other words, is **necessary but not sufficient** for sustaining the water system; this relationship has been defined as a three-legged stool.
- Many water system functions involve **more than one** capacity element.
- **Monitoring, assessment, and strategic planning** can address all three elements of capacity.

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

- **Technical capacity** is defined as:
  - 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.
- Adequate technical capacity has clear relevance for compliance with drinking water standards and other aspects of **performance.**
- This module will not address **details** of technical capacity or its assessment. Other resources are available for these purposes.

Elements of Technical Capacity

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

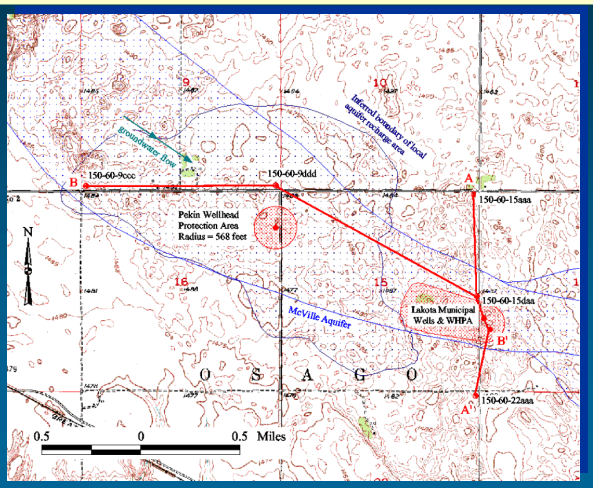
- The essential elements of **technical capacity** are:
  - Source-water adequacy and protection;
  - Infrastructure adequacy and improvement; and
  - Technical knowledge and implementation.

1a. Source-Water Protection and Adequacy

- Does the system have a reliable source of drinking water?
- Is the source of generally good quality and adequately protected?

- **Source-water protection and adequacy** can be explored by asking:
  - Does the system have a reliable source of drinking water?
  - Is the source of generally good quality and adequately protected?

Wellhead Protection



- **Source-water protection** plays a critical role in the multiple-barrier approach to drinking water protection.
- **Compliance** with source-water protection policies is an indicator of managerial capacity.
- Delineation of a **well-head protection** area is an example.
- Advanced **geographic information systems** can be used for watershed protection.
- A **comprehensive** approach to source-water protection includes external linkages in the community as well.

1b. Infrastructure Adequacy and Improvement

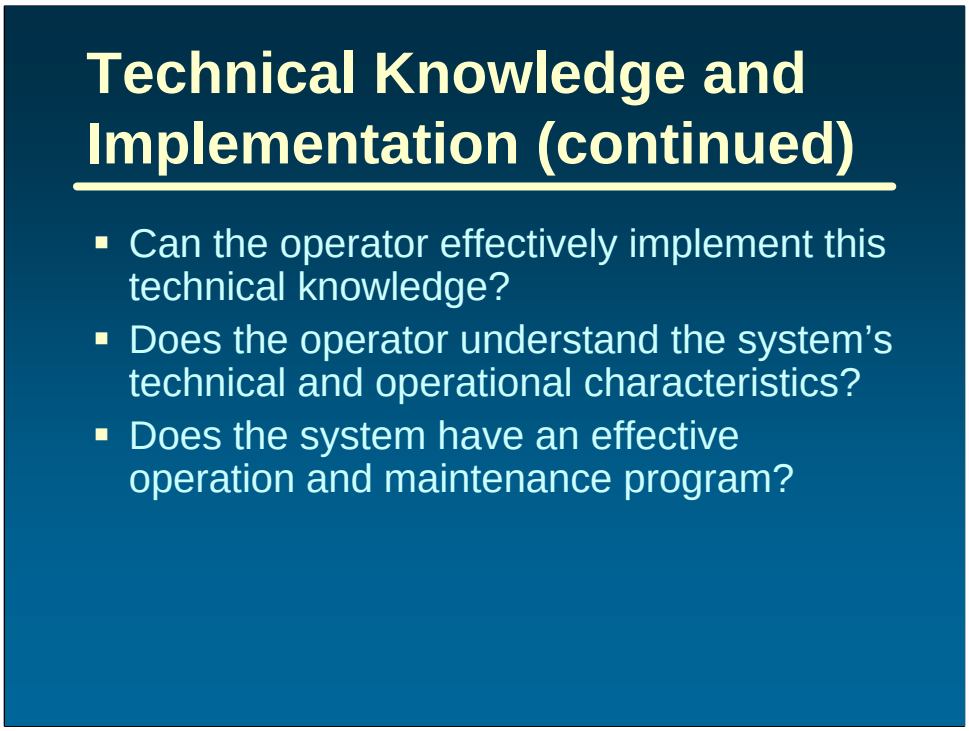
- Can the system provide water that meets SDWA standards?
- What is the condition of its infrastructure, from source of supply to distribution?
- What is the infrastructure's life expectancy?
- Does the system have a capital improvement plan?

- **Infrastructure adequacy and improvement** can be explored by asking?
  - Can the system provide water that meets SDWA standards?
  - What is the condition of its infrastructure, from source of supply to distribution?
  - What is the infrastructure's life expectancy?
  - Does the system have a capital improvement plan?

1c. Technical Knowledge and Implementation

- Is the system's operator certified?
- Does the operator have sufficient technical knowledge of applicable standards?

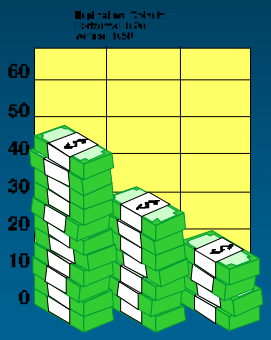
- **Technical knowledge and implementation** can be explored by asking?
  - Is the system's operator certified?
  - Does the operator have sufficient technical knowledge of applicable standards?



- Continued…
  - Can the operator effectively implement this technical knowledge?
  - Does the operator understand the system's technical and operation characteristics?
  - Does the system have an effective operation and maintenance program?

2. Financial Capacity

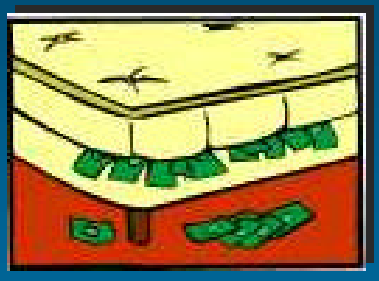
- The ability of a water system to acquire and manage sufficient financial resources to allow the system to achieve and maintain compliance with SDWA requirements



- **Financial capacity** is defined as:
  - 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 of Financial Capacity

- Revenue sufficiency
- Credit worthiness
- Fiscal controls



- The essential elements of **financial capacity** are:
  - Revenue sufficiency;
  - Credit worthiness; and
  - Fiscal controls.

2a. Revenue Sufficiency

- Are the system's costs and revenues known and measurable?
- Are system assets properly valued and reflected in rates?
- Do revenues from rates and charges cover system costs?

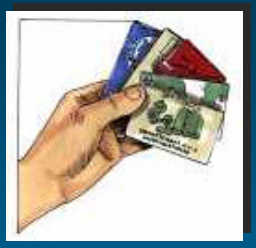
- **Revenue sufficiency** can be explored by asking:
  - Are the system's costs and revenues known and measurable?
  - Are system assets properly valued and reflected in rates?
  - Do revenues from rates and charges cover system costs?

Special Role of Cash Flow

- Positive cash flow: revenues exceed expenditures
- Cash flow is essential for small business
- Cash flow tends to correlate with other indicators
- Complex assessment methods may not be necessary

- **Positive cash flow** is essential for small water systems; it is achieved when revenues exceed expenditures for a sustained period of time.
- Cash flow is **essential** for all small businesses, including water systems.
- Cash flow tends to correlate with other indicators of **financial health.**
- Highly **complex** assessment methods (such as multivariate financial models) may not be necessary for small water systems.

2b. Credit Worthiness



- Is the system financially healthy, as measured through indicators, ratios, and ratings?
- Does it have a credit record and access to capital through public or private sources?
- Can it provide assurance of repayment?

- **Credit worthiness** can be explored by asking:
  - Is the system financially healthy, as measured through indicators, ratios, and ratings?
  - Does it have a credit record and access to capital through public or private sources?
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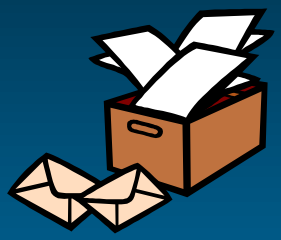
2c. Fiscal Management and Controls

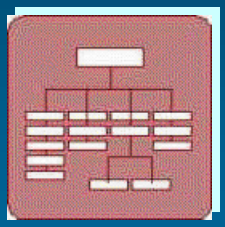


- Are adequate books and records maintained?
- Are appropriate budgeting, accounting, and financial planning methods used?
- Does the system manage its revenues effectively?

- **Fiscal management and controls** can be explored by asking:
  - Are adequate books and records maintained?
  - Are appropriate budgeting, accounting, and financial planning methods used?
  - Does the system manage its revenues effectively?

3. Managerial Capacity

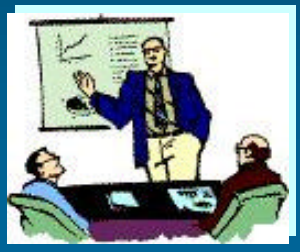
- The ability of a water system to conduct its affairs in a manner enabling the system to achieve and maintain compliance with SDWA requirements, including institutional and administrative capabilities.



- **Managerial capacity** is defined as:
  - 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 of Managerial Capacity

- Ownership accountability
- Staffing and organization
- Effective external linkages



- The essential elements of **managerial capacity** are:
  - Ownership accountability;
  - Staffing and organization; and
  - Effective external linkages.

3a. Ownership Accountability

- Are the system owners clearly identified?
- Can owners be held accountable for the system?

- **Ownership accountability** can be explored by asking:
  - Are the system owners clearly identified?
  - Can owners be held accountable for the system?

3b. Staffing and Organization

- Are the system operators and managers clearly identified?
- Is the system properly organized and staffed?
- Are standard operating procedures established and followed?
- Do personnel understand applicable regulatory requirements?
- Do personnel have adequate expertise to manage operations, including necessary licenses and certifications?

- **Staffing and organization** can be explored by asking:
  - Are the system operators and managers clearly identified?
  - Is the system properly organized and staffed?
  - Are standard operating procedures established and followed?
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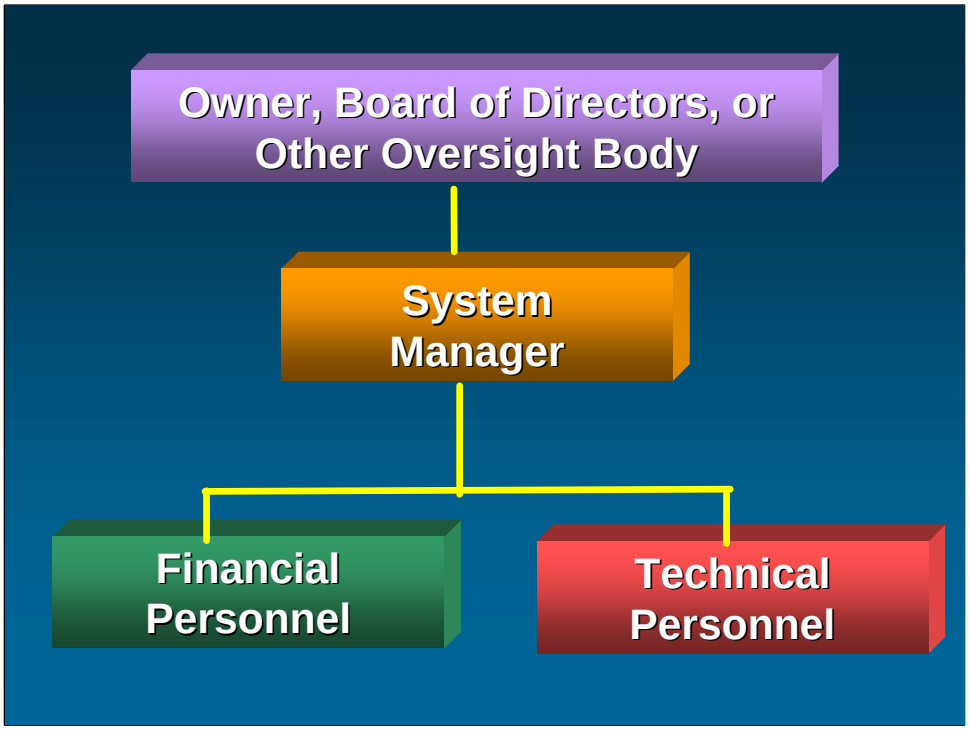
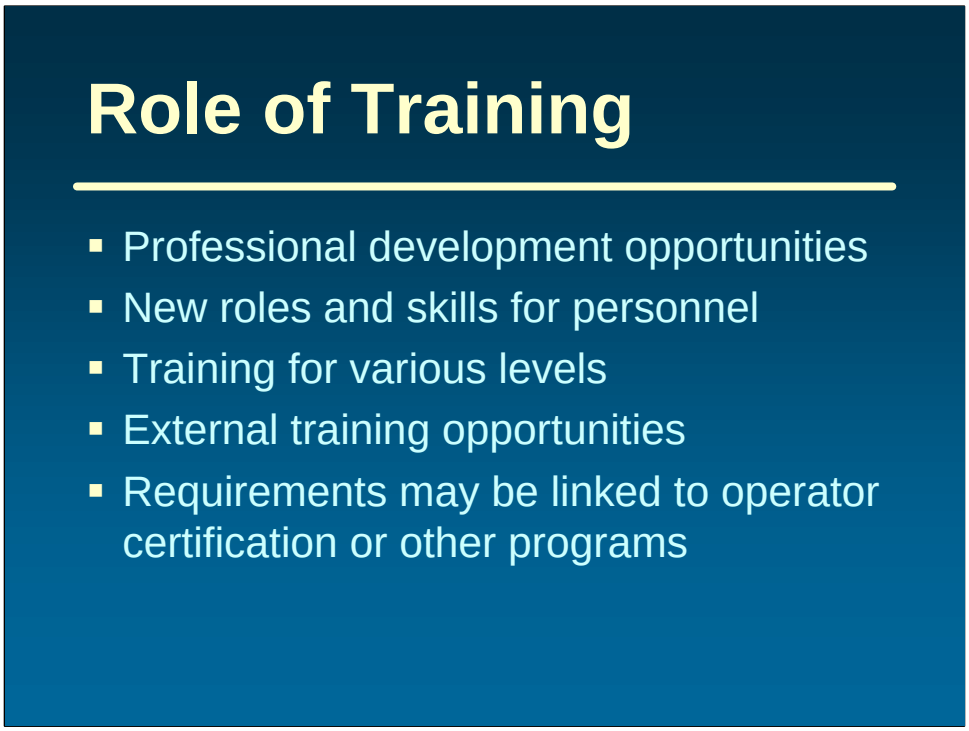


- The basic **organizational structure** of a water system generally should reflect the respective roles of technical, managerial, and financial personnel.
- Financial and technical personnel generally is accountable to a system **manager**.
- The system manager generally is accountable to the **owner** of a water system, a board of directors, or another oversight body.
- **Ongoing oversight** helps ensure accountability.
- Increasing attention is paid to the importance of **board-member training** in capacity development, including basic training in water rates and finances; in some cases, incentives or “perks” are offered to encourage Board participation.



- **Training** plays an especially important role in developing and maintaining managerial capacity for water systems:
  - **Professional development** is important to recruiting and retaining qualified staff, even if resources for salaries are limited.
  - Water system personnel must play **new roles** and have new skills.
  - **Training opportunities** exist for every level of the water system organization, from decision-makers to support staff
  - A wide range of **external** training opportunities are available.
  - **Training requirements** also are linked to operator certification requirements or other programs.

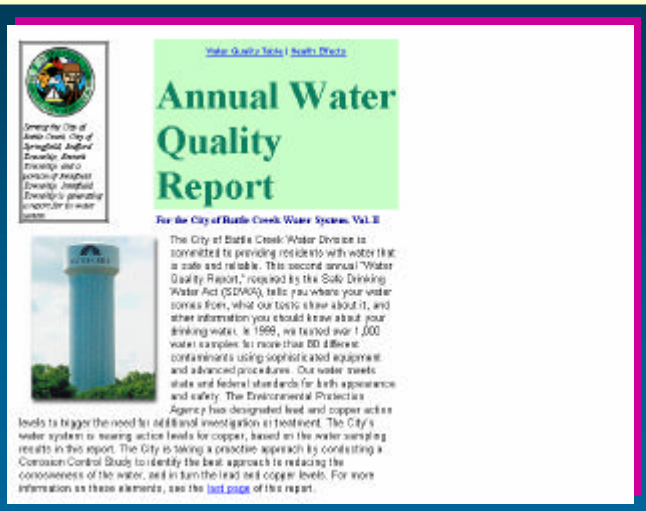
Board Member Training

- Role in long-term capacity development
- Improves understanding of needs
- Promotes leadership versus micromanagement
- Special training may be available
- Emerging requirements and incentives (perks)

- Training of oversight **board members** can play a vital role in developing water system capacity.
- Educated boards have a better understanding and appreciation of system **needs.**
- Effective boards provide **leadership** but do not micromanage the system
- Board members may need **special training** to improve understanding of the water system's financial needs and basis for developing rates.
- Some states **require** board-member training or provide special incentives (or perks) for training.

- **Effective external linkages** can be explored by asking:
  - Does the system interact well with customers, regulators, and other entities?
  - Is the system aware of available external resources, such as technical and financial assistance?

Consumer Confidence Reports



- Annual **consumer confidence reports** (on drinking water quality) provide an indicator of managerial capacity, as well as a vehicle for building capacity by strengthening external linkages.

Capacity Development: Challenge or Opportunity?

- Capacity development presents a significant *challenge,* both to water systems and State programs
- However, capacity development also presents significant *opportunities* for ensuring compliance, enhancing performance, and promoting continuous improvement

- Capacity development presents a significant **challenge,** both to water systems and state programs
- However, capacity development also presents significant **opportunities for** ensuring compliance, enhancing performance, and promoting continuous improvement.
- It may be important for to **encourage** water systems, through financial and other incentives, to take advantage of opportunities for building capacity.

Opportunities to Build Capacity

Technical	Treatment techniques Supply management Demand management
Financial	Budgets, reports, and fiscal controls Efficiency improvement Rate and revenue sufficiency
Managerial	Staffing and training Assessment and planning Organizational and structural change

- **Opportunities** for building capacity include:
  - **Technical**
    - Treatment techniques
    - Supply management
    - Demand management
  - **Financial**
    - Budgets, reports, and fiscal controls
    - Efficiency improvement
    - Rate and revenue sufficiency
  - **Managerial**
    - Staffing and training
    - Assessment and planning
    - Organizational and structural change

Case Study

- The challenge/opportunity:
  - 1,000 customers
  - Extremely high water losses
  - High overall operational costs
  - Complaints about low pressure
  - Unstable water entering distribution system
  - Needed professional management and a plan of action

- This **case study** describes how a small water authority in Pennsylvania took steps to improve technical, financial, and managerial capacity.
- **The challenges:**
  - 1,000 customers
  - Extremely high water losses
  - High overall operational costs
  - Complaints about low pressure
  - Unstable water entering distribution system
  - Needed professional management and a plan of action
- **Actions taken:**
  - Hired a new water manager who understood that he needed to act
  - Increased meter reading and accuracy (including source meters)
  - Developed a system-wide map to aid in leak management
  - Instituted an aggressive leak detection and repair program, plus corrosion controls
  - Monitored results over time to assess benefits relative to costs

Case Study (continued)

- The results achieved:
  - Reduction of water production by 60%
  - Reduction of water losses from 70% to 9%
  - Reduction of power costs of more than 60%
  - Reduction of total chemical costs of 47%, with added treatment and higher unit costs
  - Overall, improved water service

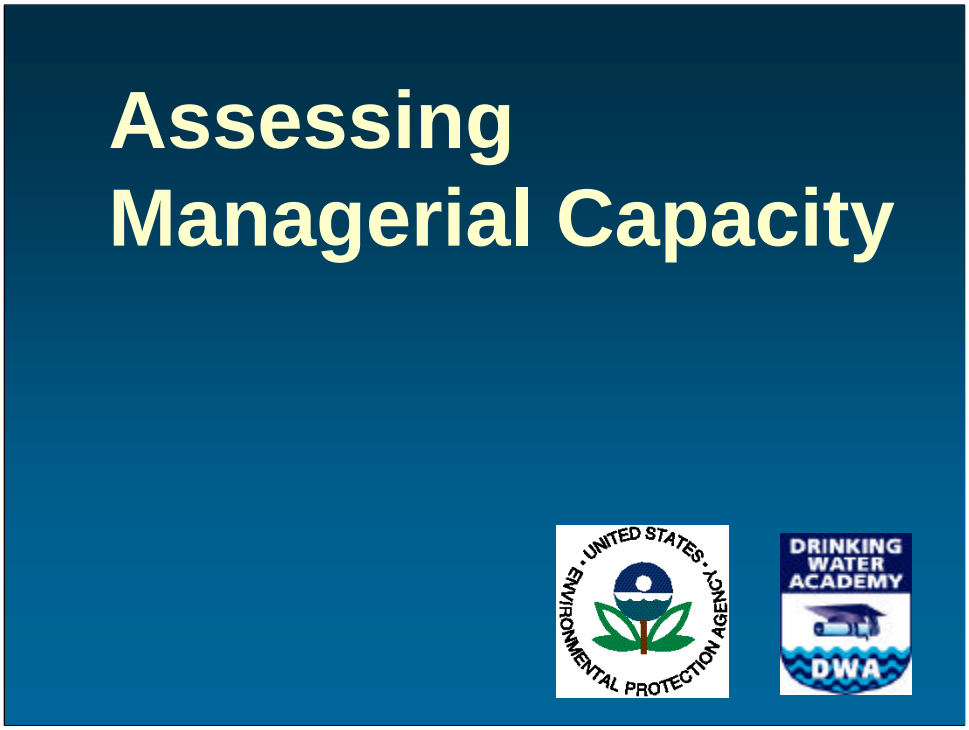
- **Results achieved:**
  - Reduction of water production by 60 percent
  - Reduction of water losses from 70 percent to 9 percent
  - Reduction of power costs of more than 60 percent
  - Reduction of total chemical costs of 47 percent, with added treatment (an improvement in quality) and higher associated unit costs
  - Overall, improved water service

Developing Capacity: What is the Weakest Link?

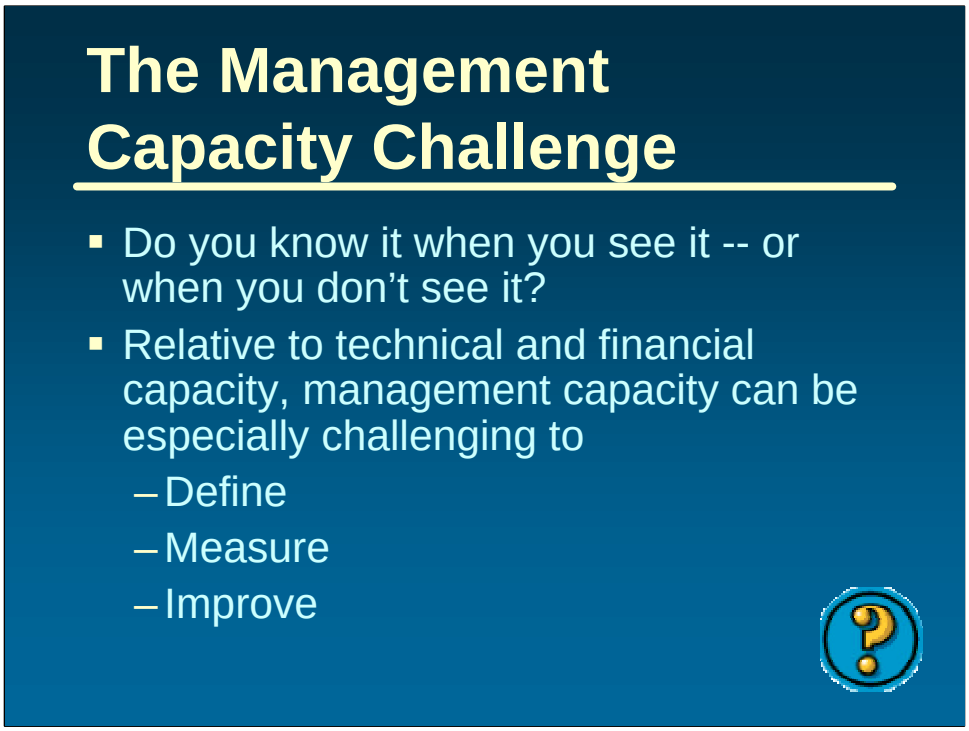
- Technical
- Financial
- Managerial

- Participants can discuss which of the elements of capacity can present the **weakest link** for water systems – and why.
- What are the **implications?**

Assessing Managerial Capacity



- Assessing Managerial Capacity



- Management capacity may **illustrate** the adage of "you know it when you see it" or, perhaps, "you know when you don't see it."
- Relative to technical and financial capacity, management capacity can be especially **challenging** to:
  - **Define.** Can be somewhat subjective.
  - **Measure.** Can be imprecise and difficult to quantity.
  - **Improve.** Can require substantial change on the part of utility managers.
- Participants are asked to **discuss** how managerial capacity can be defined, measured, and improved. What strategies are proven effective in actual cases?

Examples

- The system is in compliance with *technical* standards but fails to complete reports on a timely basis
- The system has *financial* resources, but the manager will not free them up
- The Board micromanages the water system, despite the capability of managers and staff

- Some **examples** of managerial capacity issues:
  - The system is in compliance with *technical* standards for drinking water quality but fails to complete monitoring reports on a timely basis
  - The system has *financial* resources, but the manager will not free them up for various purposes.
  - The Board micromanages the water system, despite the capability of managers and staff, so that *managers* find it difficult to implement best practices.

Assessment Methods

- Self-assessment checklists
- Performance evaluation
- Peer review
- Benchmarking
- Management audits

- **Methods for assessing** water system managerial capacity include:
  - Self-assessment checklists;
  - Performance evaluation;
  - Peer review;
  - Benchmarking; and
  - Management audits.
- Highly effective water utilities tend to follow certain **practices,** many of which are raised in the context of defining capacity (as already discussed).
- These evaluation methods have **evolved** over time to provide a range of practical methods for developing water system capacity
- Some methods can be used on a **"self-help"** basis or as part of a broader technical assistance program

1. Self Assessment Checklists

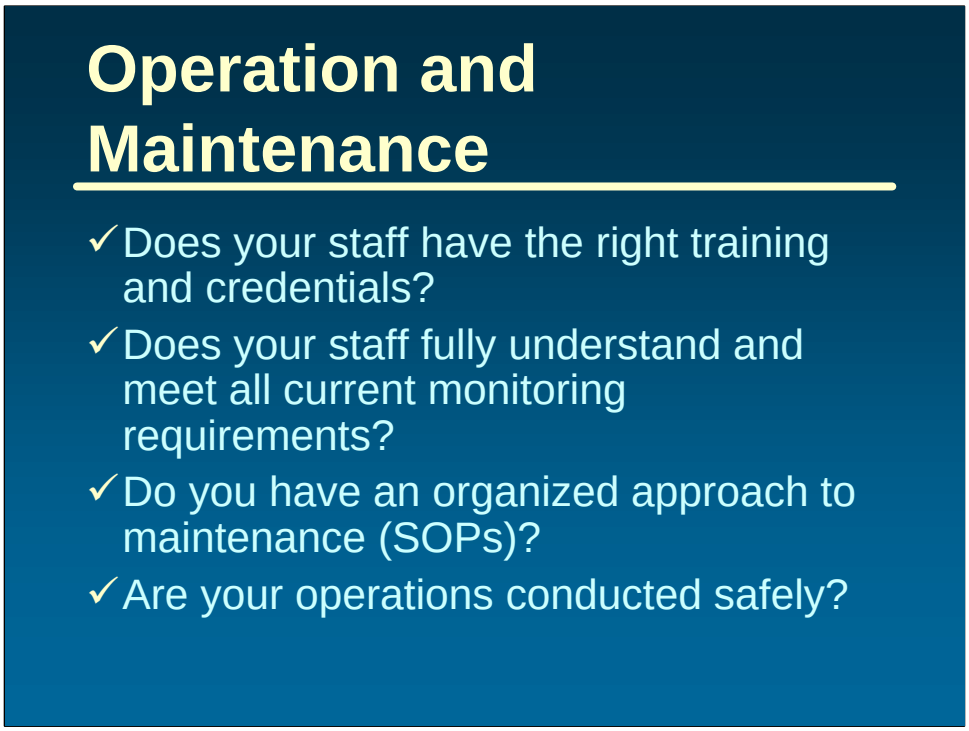
- Checklists are available for assessing each area of capacity
- Useful for screening
- Limited to simple measurement
- Inexpensive and easy to use
- Precursor to other methods

- Numerous **self-assessment checklists** are available for technical, financial, and managerial capacity.
- A simple checklist evaluation method can very useful for **screening** to identify systems that face particular capacity issues.
- Checklists are **limited** to simple measurement and may lack integration of findings.
- Checklists are **inexpensive** and relatively easy to use. They can be very cost-effective for resource-strapped small water systems.
- Checklists can be used as a **precursor** to other methods for capacity development, including strategic planning.

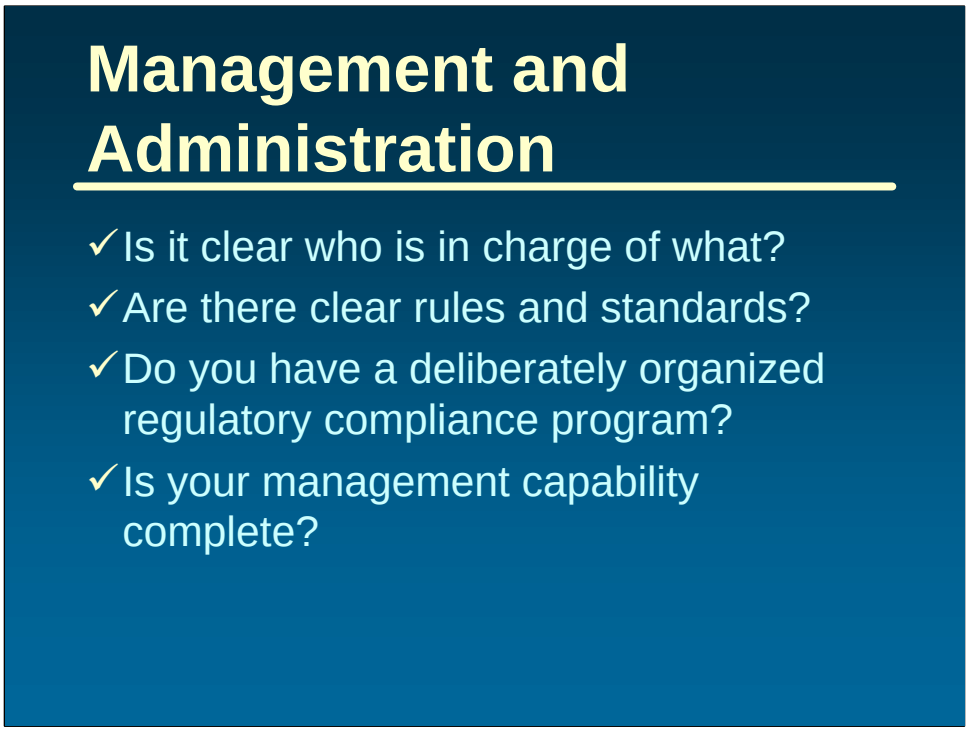
Checklists for Assessing Managerial Capacity

- A dozen or so questions
  - Operation and maintenance
  - Management and administration
  - Planning

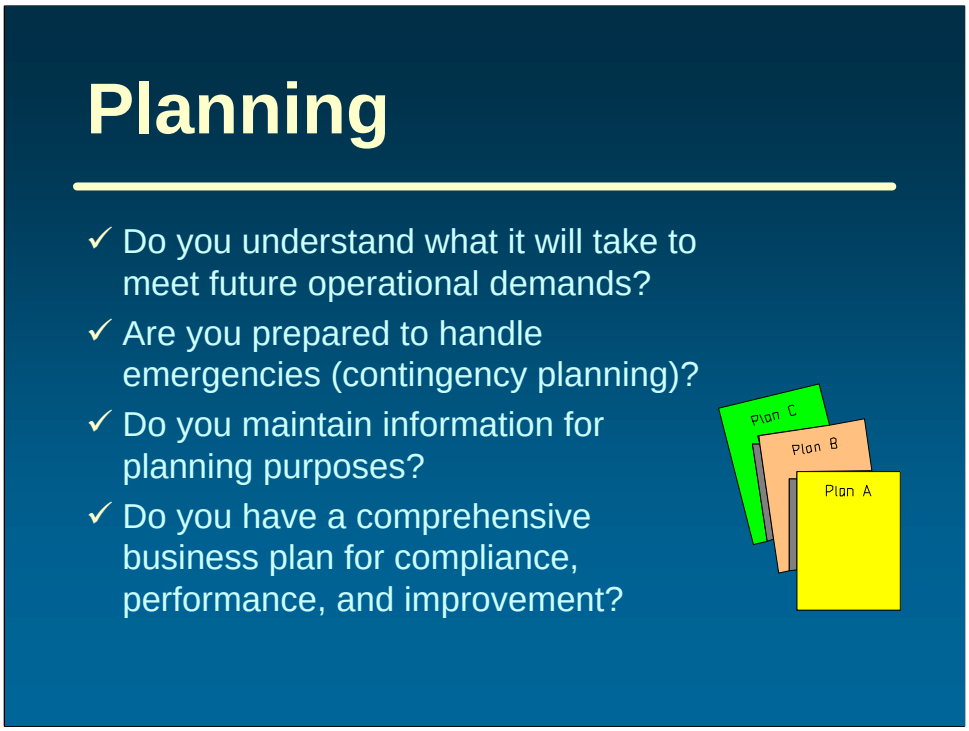
- Some very simple **checklists** are useful tools for capacity development and screening purposes.
- A **"dozen or so"** questions can guide a simple analysis of managerial capacity focusing on three areas:
  - Operation and maintenance;
  - Management and administration; and
  - Planning.



- The following questions can be used to assess managerial capacity in terms of **operation and maintenance:**
  - Does your staff have the right training and credentials?
  - Does your staff fully understand and meet all current monitoring requirements?
  - Do you have an organized approach to maintenance (standard operating procedures)?
  - Are your operations conducted safely?



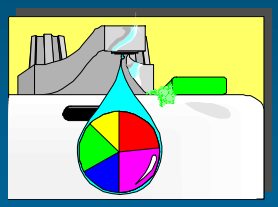
- The following questions can be used to assess managerial capacity in terms of **management and administration:**
  - Is it clear who is in charge of what?
  - Are there clear rules and standards?
  - Do you have a deliberately organized regulatory compliance program?
  - Is your management capability complete?



- The following questions can be used to assess managerial capacity in terms of **planning:**
  - Do you understand what it will take to meet future operational demands?
  - Are you prepared to handle emergencies (contingency planning)?
  - Do you maintain information for planning purposes?
  - Do you have a comprehensive business plan for compliance, performance, and improvement?

2. Performance Evaluation

- A review of performance using records, documents, and reports prepared by the water utility
- Requires expertise and objectivity
- The process of assessment plays a role in the process of improvement



- A **performance evaluation** can use the records, documents, and reports prepared by the water utility, including:
  - Internal reports for use by utility managers; and
  - External reports filed with oversight boards or regulatory agencies
- **Reporting** is a very basic function, and a building block for many in-depth planning and managerial activities.
- A review requires a degree of managerial **expertise and objectivity**; systems may need an external consultant for this purpose.
- The process of assessment plays a role in the process of **improvement.**

Annual Report

- Reporting ensures accountability to oversight bodies
- Reports are useful for evaluating financial and managerial capacity
- Preparing a report enhances capacity
- Can be prepared by an independent analyst

- An **annual report** is very useful for evaluating performance and assessing financial and managerial capacity.
- Annual financial and other reports ensure **accountability** to oversight bodies, including boards of directors and regulators. Regulators may have reporting requirements.
- Annual reports are useful for evaluating **financial and managerial** capacity in both qualitative and quantitative terms.
- The **process of preparing** is a means of enhancing the capacity of the water system.
- Some annual reports are prepared and certified by an **independent analyst.**

Performance Studies

- Financial audit
- Cost-of-service study
- Valuation study
- Demand analysis
- Source-water assessment
- Customer satisfaction survey
- Needs assessment
- Options analysis

- Various **performance studies** can be used to gain in-depth knowledge that will be useful for management and planning. Some studies may require data collection, research, statistical analysis, or assistance from outside experts. Studies at individual utilities can be undertaken as part of national studies conducted through governmental agencies and trade organizations.
- Performance studies include:
  - Financial audit – to conduct a thorough review of revenue and cost data, including fiscal procedures and controls.
  - Cost-of-service study – to ensure that rates are designed to recover the utility's costs in a manner that is fair to all customers.
  - Valuation study – to ensure that the utility understands the value of its system.
  - Demand analysis – to evaluate how, when, and where water is used.
  - Source-water assessment – to determine the quality and adequacy of water sources.
  - Customer satisfaction survey – to ascertain if the utility is meeting its customers' expectations.
  - Needs assessment – to estimate the utility's future capital and operating requirements.
  - Options analysis – to outline strategic options for the utility, including structural options, for meeting future needs.

Trend Analysis

- Trends in key performance indicators (e.g., financial)
- Requires consistent measurement
- Controls for other factors and helps identify anomalies.
- Short-term and long-term horizons
- Identifies weaknesses and potential remedies

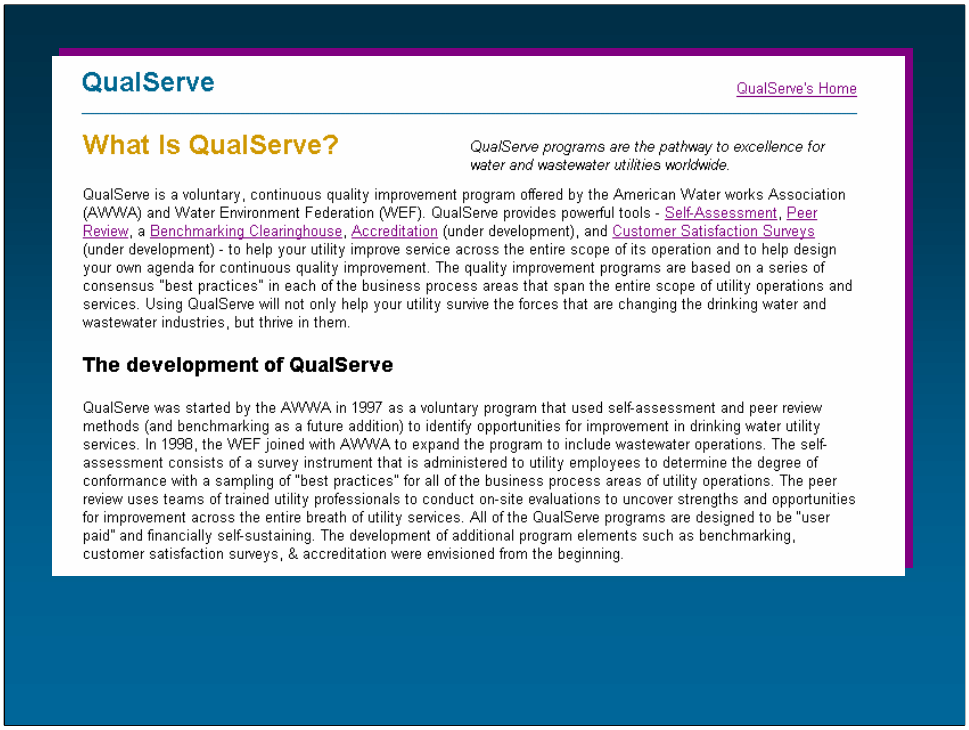
- Performance evaluation is enhanced by the study of **trends** in key areas of performance.
- **Trend analysis** makes use of time series data for key performance indicators, particularly measures of financial performance.
- Requires **consistent measurement.**
- **Controls** for other factors and helps identify anomalies.
- Short-term and long-term **horizons** can be used.
- The **analysis of trends** can point to particular financial weaknesses and potential remedies.

- A water utility also may be subjected to **external performance reviews,** including:
  - Regulatory review of rates and finances by state public utility commissions;
  - State review of required plans by regulatory, resource management, or other agencies;
  - Review of grant and loan applications by State Revolving Loan Fund and other programs;
  - Due diligence reviews conducted in connection with acquisitions (for the benefit of the acquiring company); and
  - Bankruptcy and receivership proceedings that may involve water systems.

3. Peer Review

- Shared expertise from one water utility to another
- Can involve various types of expertise
- Can be continued over time to include implementation

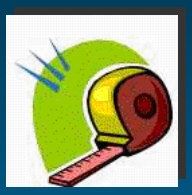
- **Peer review** by from one utility to another can improve managerial capacity through shared expertise.
- The **review** can involve various types of expertise throughout the water utility organization.
- The review process can be continued **over time** to provide reviewers with adequate knowledge of the system and to begin implementing suggested improvements.



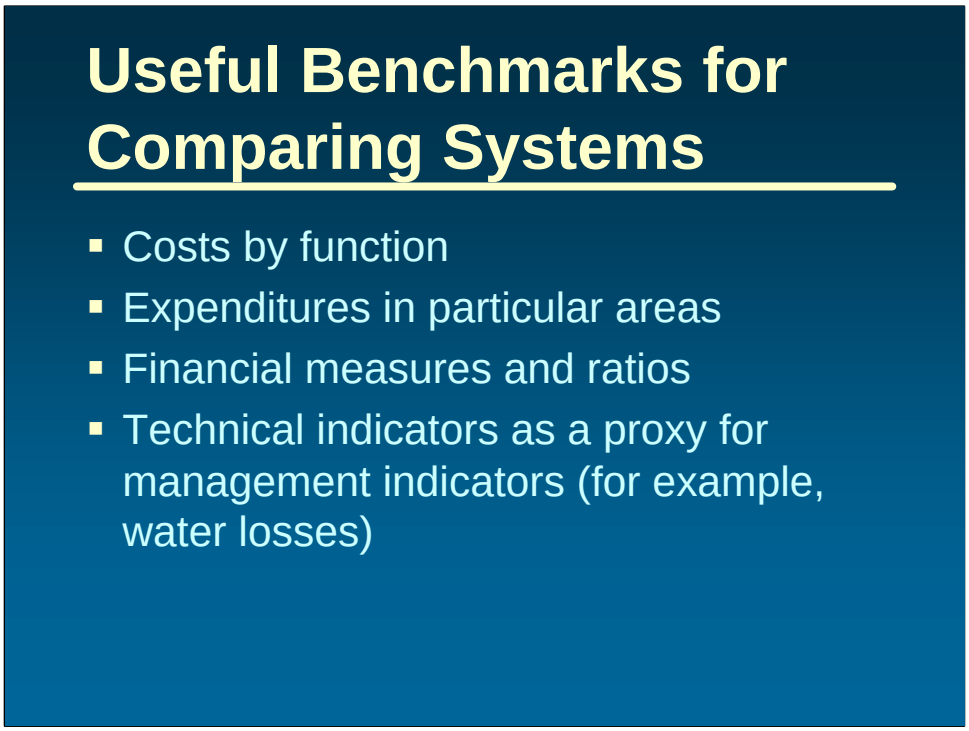
- **QualServe** is the peer review program sponsored by the American Water Works Association and the Water Environment Federation (WEF).
- “QualServe is a voluntary, continuous quality improvement program… QualServe provides powerful tools - Self-Assessment, Peer Review, a Benchmarking Clearinghouse, Accreditation (under development), and Customer Satisfaction Surveys (under development) - to help your utility improve service across the entire scope of its operation and to help design your own agenda for continuous quality improvement. The quality improvement programs are based on a series of consensus "best practices" in each of the business process areas that span the entire scope of utility operations and services. Using QualServe will not only help your utility survive the forces that are changing the drinking water and wastewater industries, but thrive in them.

4. Benchmarking

- Metrics and processes
- Useful for comparable systems
- Requires caution because comparability is difficult to achieve
- Ranges are preferable to points
- Comparing rates is problematic
- Benchmarking can identify areas for improvement



- **Benchmarking** can focus on particular metrics or on processes.
- Benchmarking can be used to compare a water system to **comparable systems.**
- Benchmarking requires considerable **caution** because comparability among systems is difficult to achieve (e.g., size, age, source water, etc.)
- **Ranges in values** are preferable to particular points of reference.
- **Comparing rates** charged for service is particularly problematic because of difference in ratemaking practices.
- Benchmarking can provide insights about system costs and efficiency, and identify areas for **improvement.**

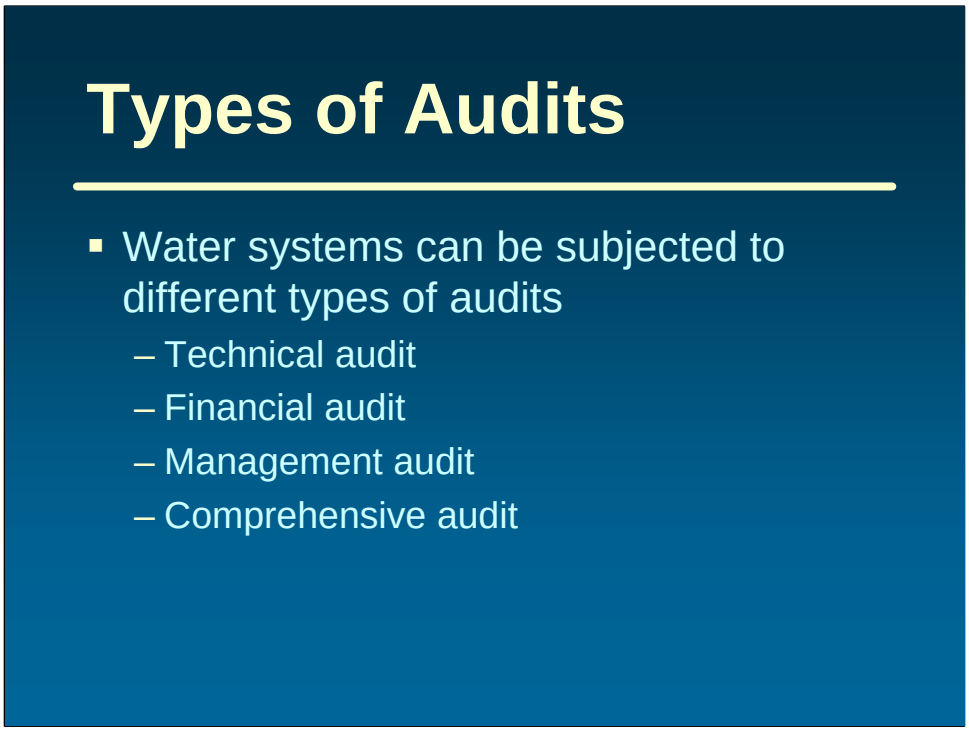


- Some **useful performance benchmarks** are:
  - Costs by function (such as administrative cost per customer);
  - Expenditures in particular areas;
  - Financial measures and ratios; and
  - Technical indicators as a proxy for management indicators (for example, water losses).

5. Management Audit

- Review of
  - Organizational structure
  - Information systems
  - Decision-making processes
- Recommendations for improvement
- A blueprint for action

- **Management audits** consist of reviews to assess:
  - Organizational structure, including personnel capability and leadership;
  - Information systems; and
  - Decisionmaking processes.
- **Recommendations** for improvement are usually made to management.
- These recommendations can be used as a **blueprint** for action.

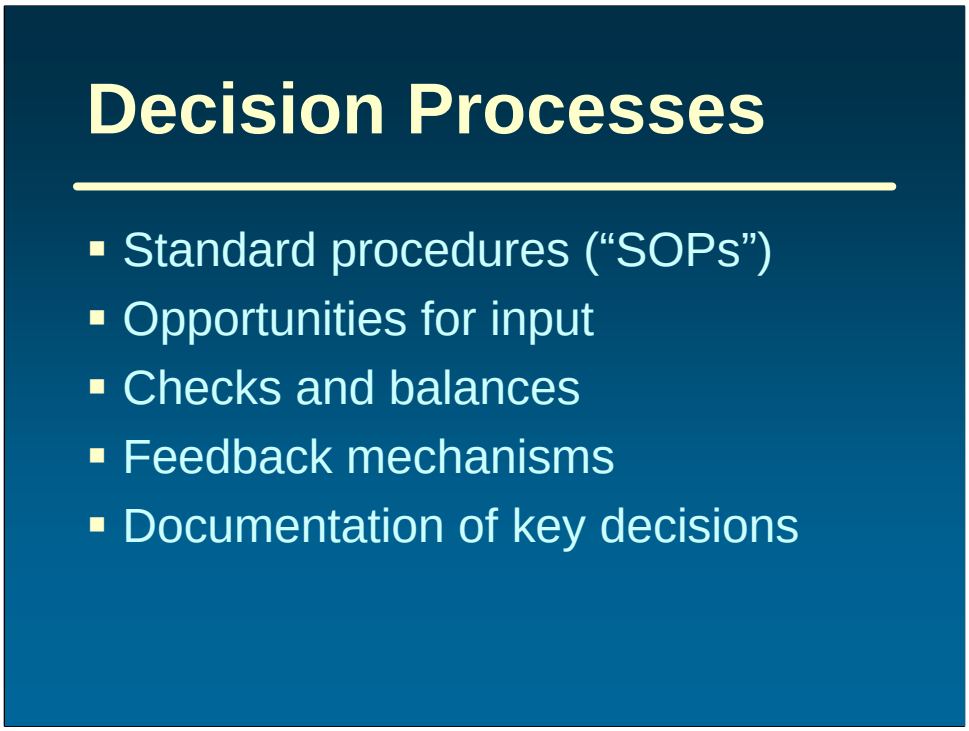


- Water systems can be subjected to different types of **general or specialized audits**.
- Audits can be performed on an in-house basis, but also by outside **experts.**
- Audits can address various aspects of a utility's **operations.** Audit results can serve as a guide to other improvement strategies.
- **Auditing tools** include:
  - Technical audit – am inventory and technical review of the utility's technical operations (treatment plants, water sources, pumping, storage, distribution, fire protection).
  - Financial audit – a review of the utility's financial condition.
  - Management audit – a review of the utility's management practices (labor practices, customer service, billing, metering, regulatory compliance).
  - Comprehensive audit – a combined audit covering all three elements of capacity.

Information Systems

- Information management systems
- Computer hardware
- Software applications
- Website and internet capabilities
- Geographic information systems

- **Information systems** can help build technical capacity and are also used for financial and managerial purposes.
- **Information systems** tools include:
  - Information management system – comprehensive package to track and manage utility operations (may include technical, managerial, and financial modules).
  - Computer hardware – computer equipment to run the software described below
  - Computer software:
    - Technical software – could include computer-aided design, SCADA, flow monitoring, and other software to monitor utility's physical operations and guide maintenance decisions.
    - Financial software – software to track capital investment, expenses, revenues.
    - Management software – software to track information about personnel, customer complaints, billing, and related information.
  - Website and internet capabilities.
  - Geographic information systems – integrates customer and technical system information (such as location of valves, pipe sizes, flow rates).



- A management audit will address various aspects of organizational **decision-making processes,** including:
  - Standard operating **procedures** (“SOPs”) -- used to guide decision-making in various management areas (including procedures related to information systems).
  - Opportunities for **input** from various stakeholders, including employees, customers, communities, and others.
  - **Checks and balances** to provide accountability for decisions throughout the organization and management structure.
  - **Feedback** mechanisms to ensure the decision-makers can make necessary adjustments to decisions.
  - **Documentation** of key decisions in the form of records and reports, including public documents as appropriate.

Opportunities for Building Managerial Capacity

- Opportunities for Building Managerial Capacity

Building Managerial Capacity

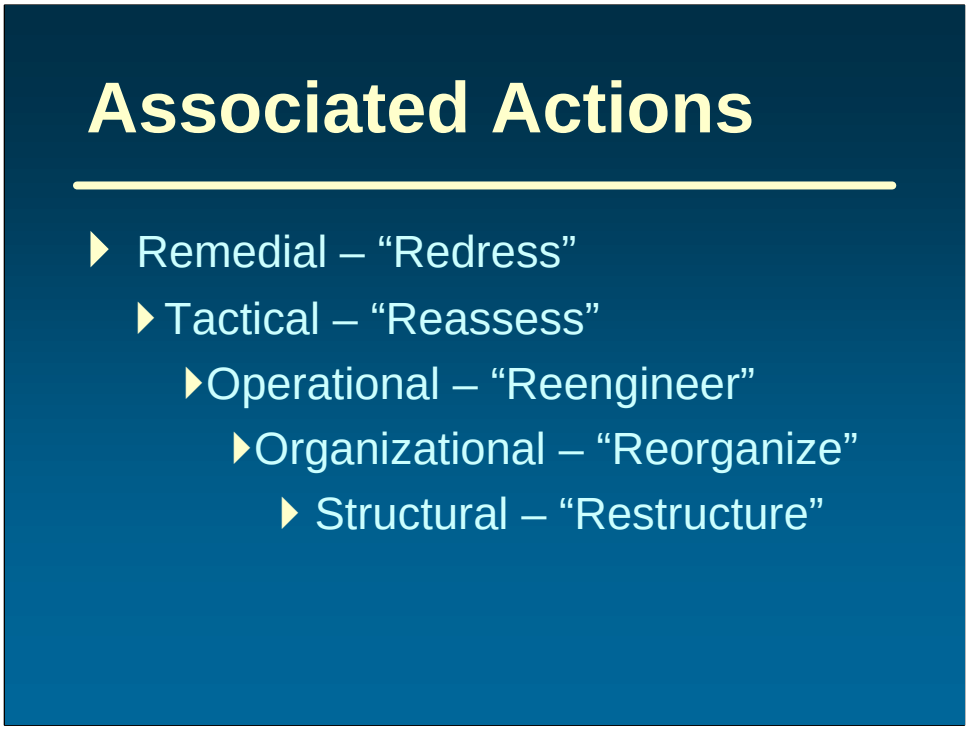
- Many tools are available for building water system managerial capacity
- Capacity assessment can be an important first step in identifying potential tools
- Water systems may need to implement more than one tool

- Many **tools** are available for building water system managerial capacity.
- Capacity **assessment** can be an important first step in identifying potential tools.
- More often than not, water systems will benefit by implementing **more than one tool** for building managerial capacity.

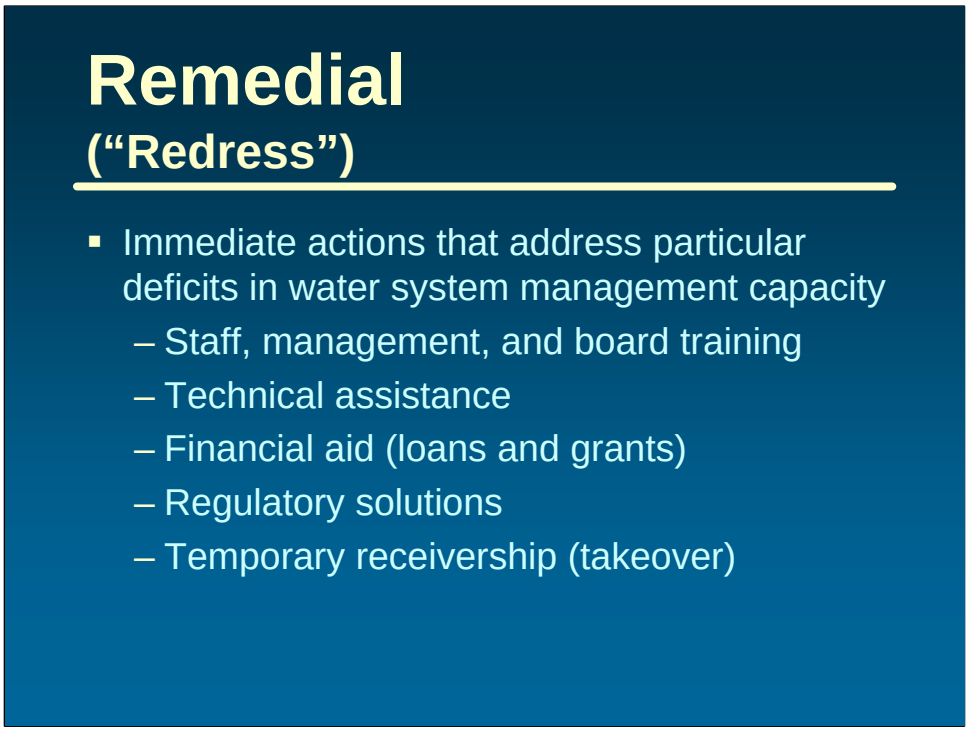
Management Options Hierarchy

- Remedial
  - Tactical
    - Operational
      - Organizational
        - Structural

- Opportunities for building managerial capacity can be thought of in terms of a very **general hierarchy** as follows:
  - Remedial
  - Tactical
  - Operational
  - Organizational
  - Structural
- The progression in the hierarchy represents the degree of **change** involved for the water system.

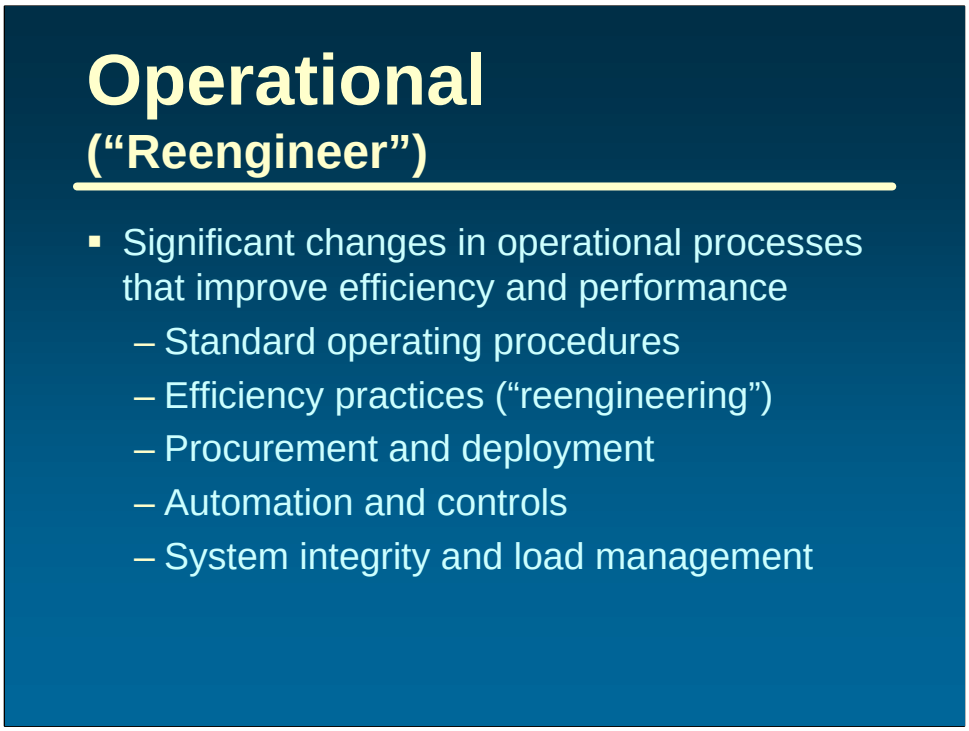


- Each step in the hierarchy is associated with certain **actions or strategies.**
  - The purpose of a remedial strategy is to "redress."
  - The purpose of a tactical strategy is to "reassess."
  - The purpose of an operational strategy is to "reengineer."
  - The purpose of an organizational strategy is to "reorganize."
  - The purpose of a structural strategy is to "restructure."



- **Remedial** strategies involve immediate actions that address particular deficits in water system management capacity:
  - Staff, management, and board training;
  - Technical assistance;
  - Financial aid (loans and grants);
  - Regulatory solutions; and
  - Temporary receivership (takeover).

- **Tactical strategies** involve assessment and planning tools that identify areas for change and improvement:
  - Self assessment;
  - Information systems;
  - Accounting and budgeting;
  - Peer review, benchmarking, audits; and
  - Long-term planning .



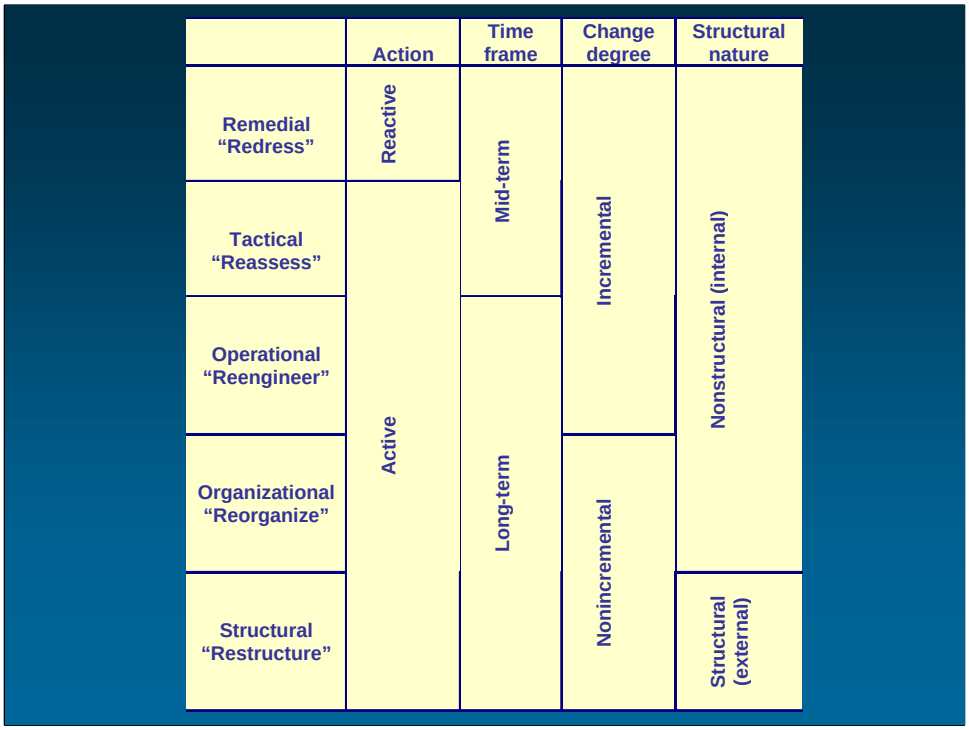
- **Operation strategies** involve significant changes in operational processes that improve efficiency and performance:
  - Standard operating procedures;
  - Efficiency practices ("reengineering");
  - Procurement and deployment;
  - Automation and controls; and
  - System integrity and load management.

- **Organizational strategies** involve substantial changes in the organization and management of the water system:
  - Reorganization of the utility system;
  - Systems of accountability;
  - Management composition;
  - Contract services (project specific); and
  - Partnerships and alliances (nonstructural).

Structural
("Restructure")

- Fundamental changes in the ownership or operation of the water system
  - Consolidated operations (regionalization) or management (satellite)
  - Convergence with another utility
  - Relinquishment of functions or roles
  - Contract services (system-wide)
  - Divestiture (sale) of assets

- **Structural strategies** involve fundamental changes in the ownership or operation of the water system:
  - Consolidated operations (regionalization);
  - Consolidated management (satellite);
  - Relinquishment of functions or roles;
  - Contract services (system-wide); and
  - Divestiture (sale) of assets.

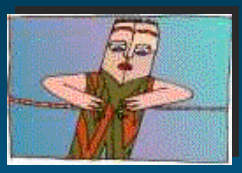


- The strategies in the hierarchy also can be **distinguished** according to action, time frame, change degree, and structural nature (as illustrated).
- For example, **structural** options are action-oriented, long-term, nonincremental, and distinct from the nonstructural solutions.

Exploring Structural Options

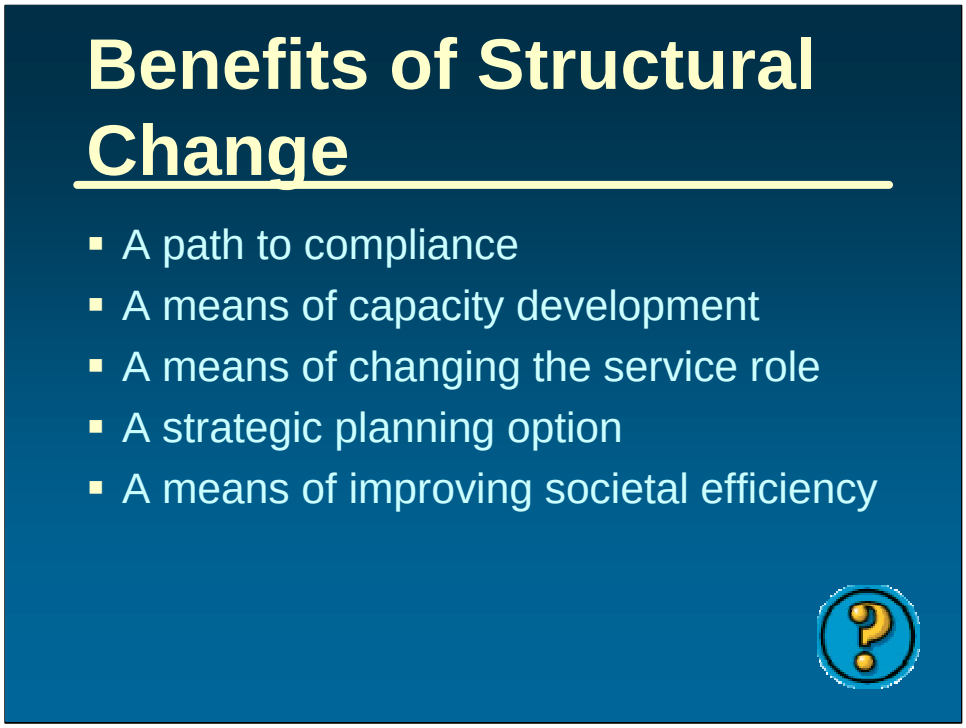
- Exploring Structural Options

Structural Change

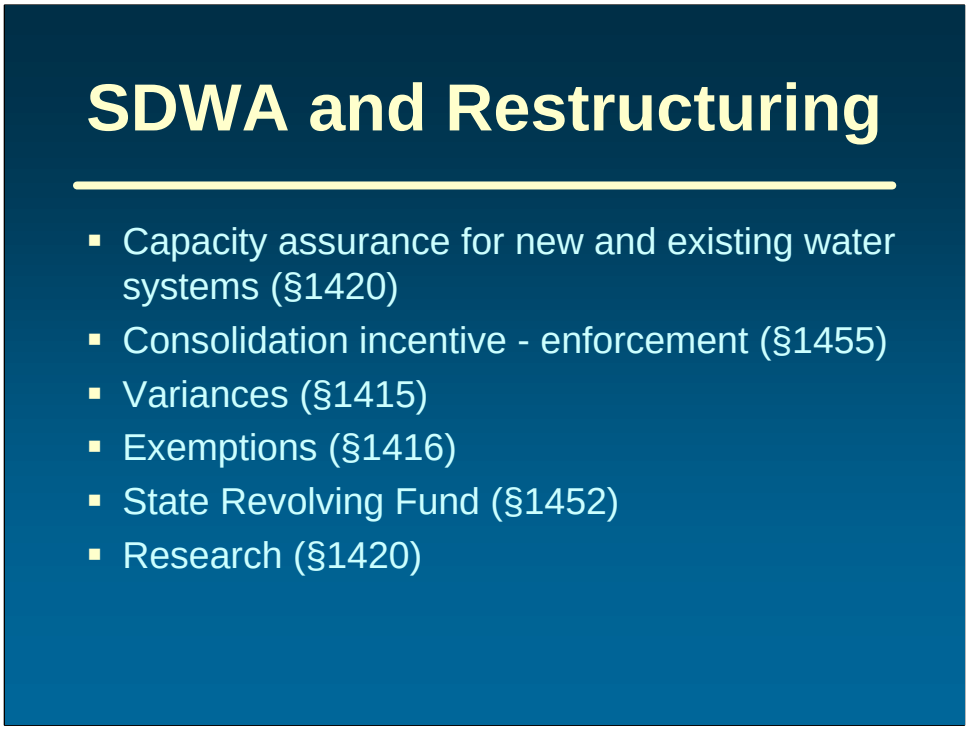


- Structural change can be an effective means of building water system capacity
- Structural change involves various forms of consolidation, as well as transfers and changes in roles and ownership
- In many cases, structural change includes significant organizational change

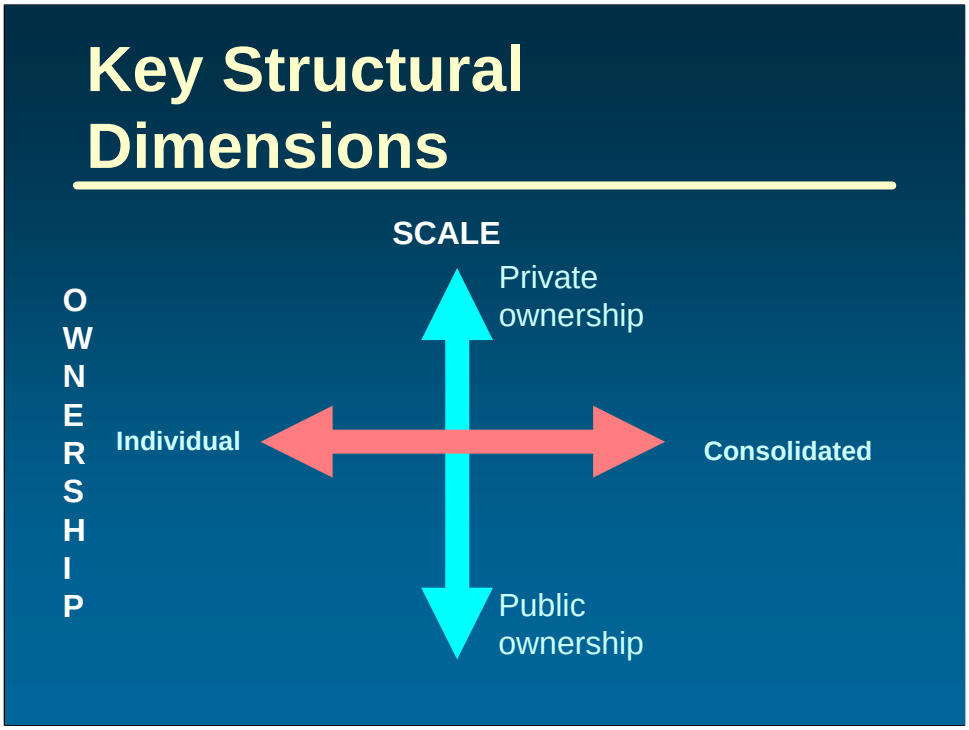
- **Structural change** can be an effective means of building water capacity by achieving scale economies and other significant performance improvements to overcome performance limiting factors.
- Structural change involves various forms of **consolidation,** as well as transfers and changes in **ownership and operational roles.**
- In many cases, structural change includes significant **organizational change** (such as new management of the water system).



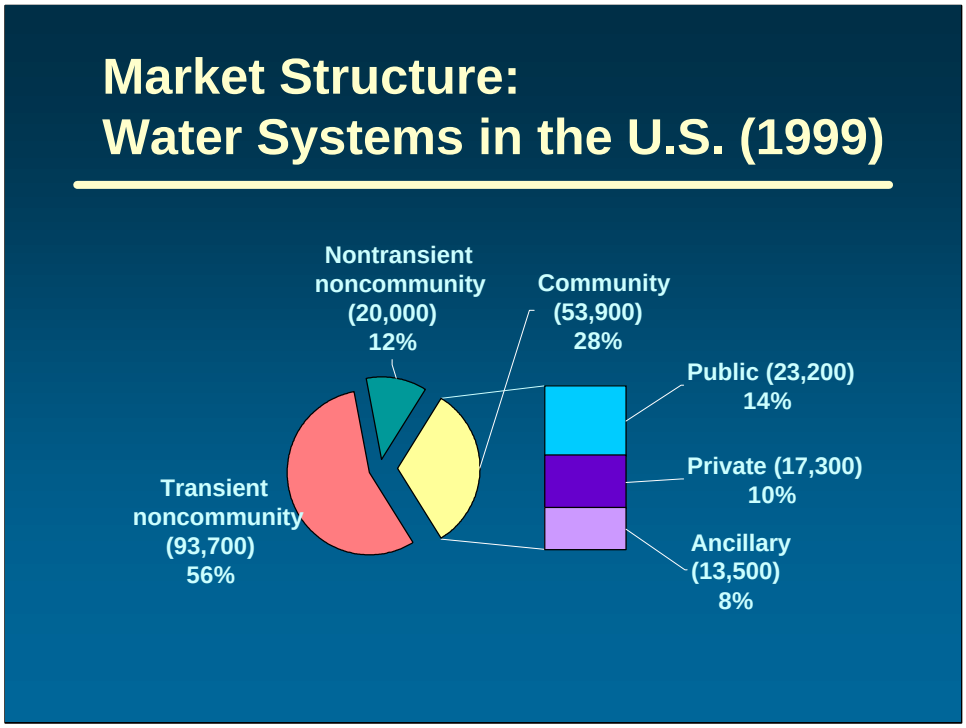
- Structural change can be very **beneficial** to water systems.
- Structural change can provide:
  - A path to compliance;
  - A means of capacity development;
  - A means of changing the service role;
  - A strategic planning option; and
  - A means of improving the societal efficiency of the water industry.



- The **Safe Drinking Water Act**, as amended in 1996, provides several important references to structural change, including:
  - Capacity assurance for new and existing water systems (§1420)
  - Consolidation incentive - enforcement (§1455)
  - Variances (§1415)
  - Exemptions (§1416)
  - State Revolving Fund (§1452)
  - Research (§1420)

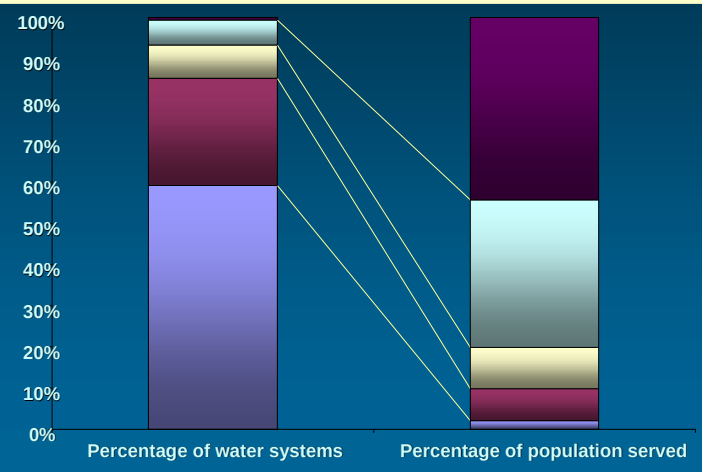


- **Ownership** (public v. private) and **scale** (individual systems v. consolidated systems) are two key dimensions of water industry structure.



- The water industry is highly **fragmented.**
- The **total U.S. water industry** consists of more than 180,000 transient and nontransient noncommunity water systems, and community water systems.
- The more than 50,000 **community water systems** are divided into public, private, and ancillary ownership categories.
  - Private systems are owned by single or multiple owners, investor, or associations.
  - Public systems are owned by cities, counties, or special governmental districts.
  - Ancillary systems are systems run as an ancillary part of a larger enterprise (such as a school or factory).

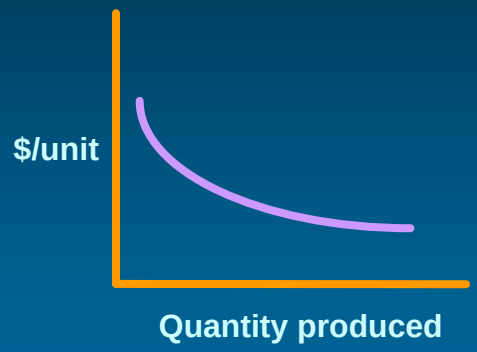
Water Systems and Population Served (1995)



- The large number of **smaller water systems** is an enduring feature of the U.S. water industry.
- As a generalization, **about 90 percent** of the water systems serve about 10 percent of the population; about 10 percent of the systems serve about 90 percent of the population.
- Most people served by community water systems are served by **larger systems.**
- Lacking **economies of scale** is the biggest impediment to performance by smaller water utilities.
- **Regionalization** of the water industry, including physical interconnection as well as common management, will be very beneficial.

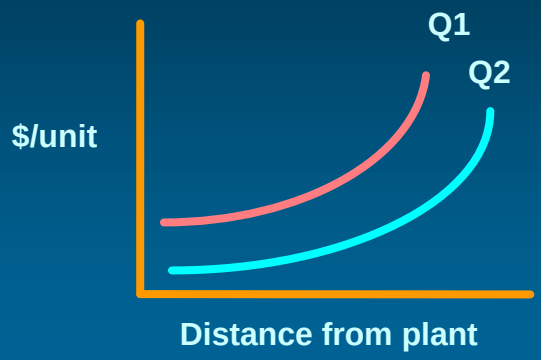
- **Consolidation** of the water industry is supported from a number of theoretical and practical perspectives:
  - **Economic.** Economies of scale and scope.
  - **Financing.** Access to capital, lower cost.
  - **Engineering.** Operational efficiency, technological improvement.
  - **Natural resource.** Resource management, watershed protection.
  - **Drinking water standards.** Compliance, capacity development, affordability of service.
- The **rationale for consolidation** differs between the thousands of small systems on one end of the spectrum (where capacity development is a key driver) and the major investor-owned utilities on the other (where competition with multinational corporations is a driver).

Economies of Scale in Production

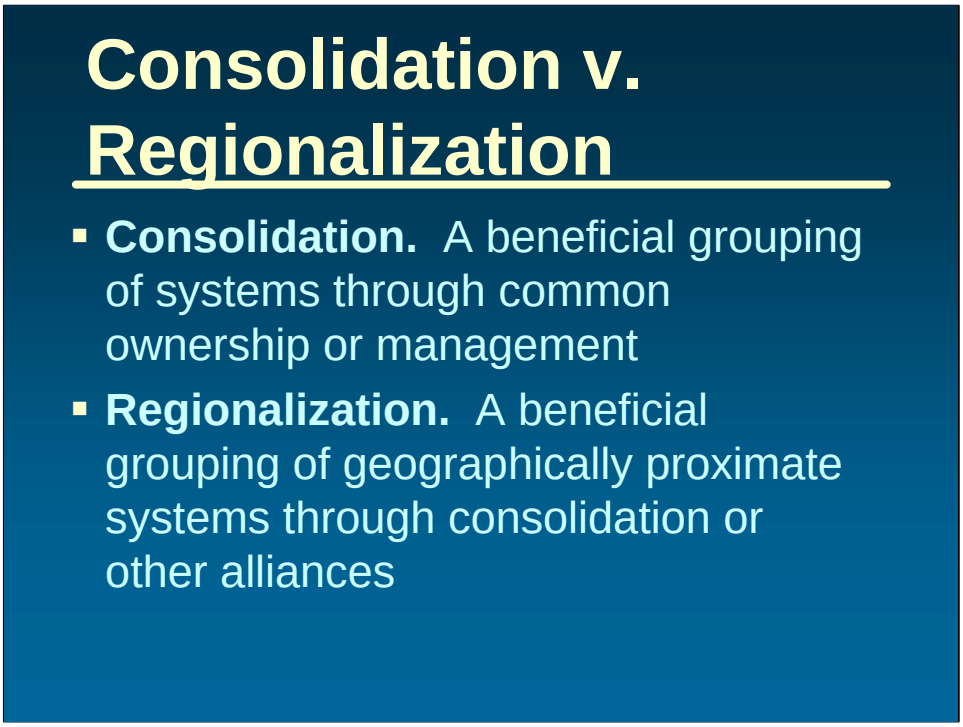


- Water systems can achieve **economies of scale** in source development and water treatment.
- Economies of scale are depicted by a **declining unit-cost curve,** that is, the cost per unit of production decreases as total production increases.
- At some point along the production curve, economies of scale stabilize or reach **"diminishing returns."**

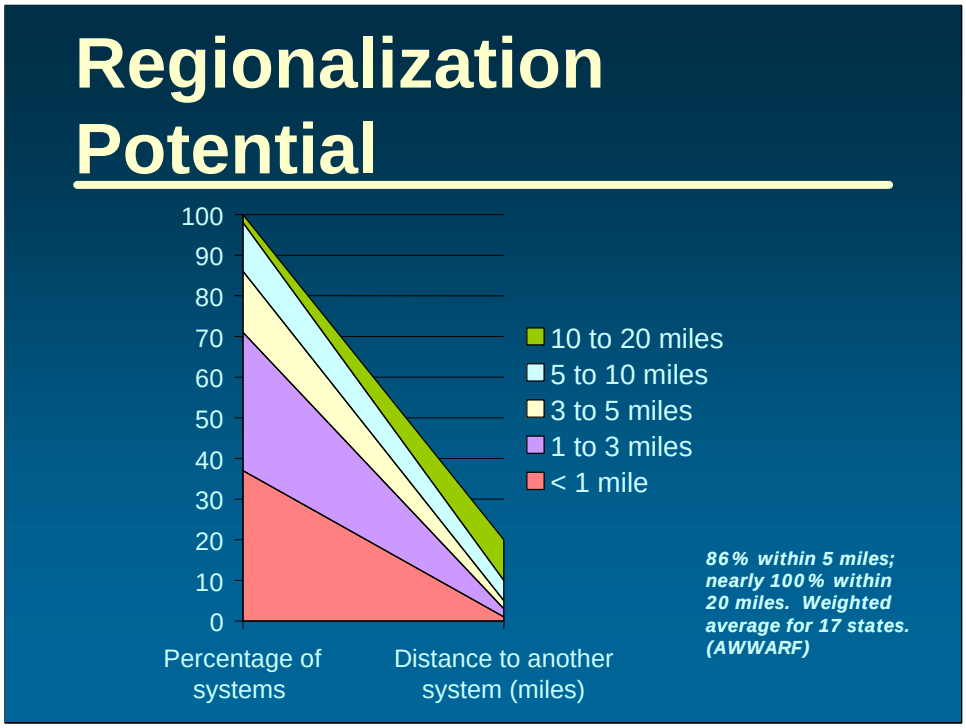
Diseconomies of Transmission



- The substantial economies of scale in production that can be achieved within regional water systems are quickly offset by the **high cost of transmission,** represented by increasing unit costs with increasing distances.
- The actual **tradeoff** requires an economic analysis of the marginal or incremental cost of production compared with the avoided cost of production at the distant location.
- The analysis also must take into account the environmental **externalities** associated with depleting water resources in one location in order to supply water to another location.

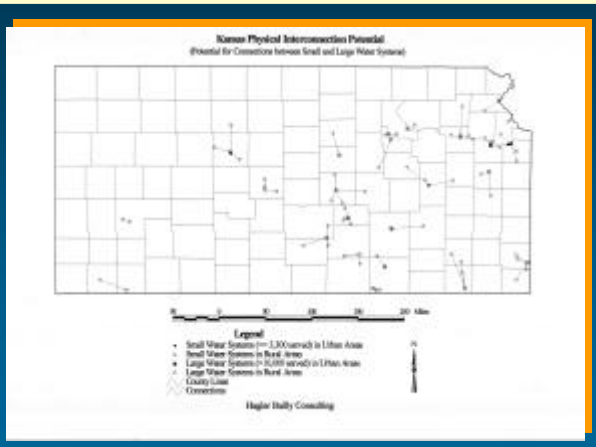


- The **terms** consolidation and regionalization often are used interchangeably.
- **Consolidation.** A beneficial grouping of systems through common ownership or management.
- **Regionalization.** A beneficial grouping of geographically proximate systems through consolidation or other agreements.



- A **recent study** by the American Water Works Association Research Foundation (AWWARF) demonstrated the potential for both physical interconnection among water systems, as well as satellite management by a group of systems by a common provider.
- For a **weighted sample** of 17 States the study also found that 86 percent of systems are located within 5 miles and nearly 100 percent are located within 20 miles.

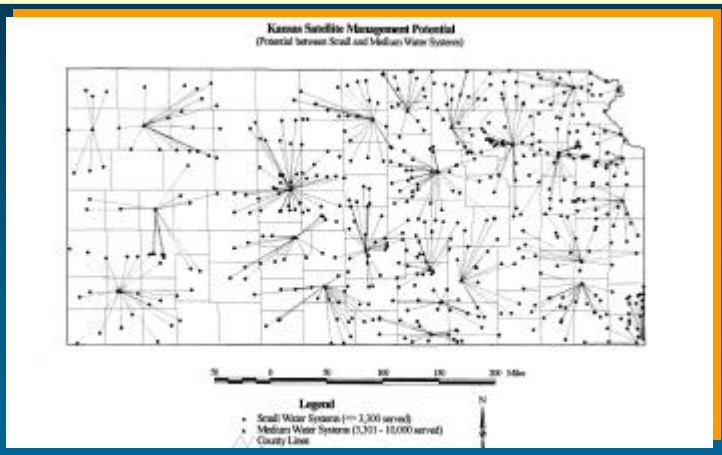
Physical Interconnection



Source: AWWARF report.

- **Map** illustrating somewhat limited opportunities for physical interconnection (Kansas).

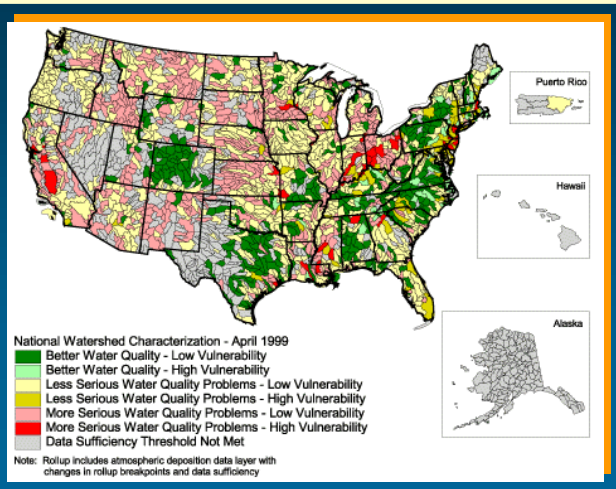
Satellite Management



Source: AWWARF report.

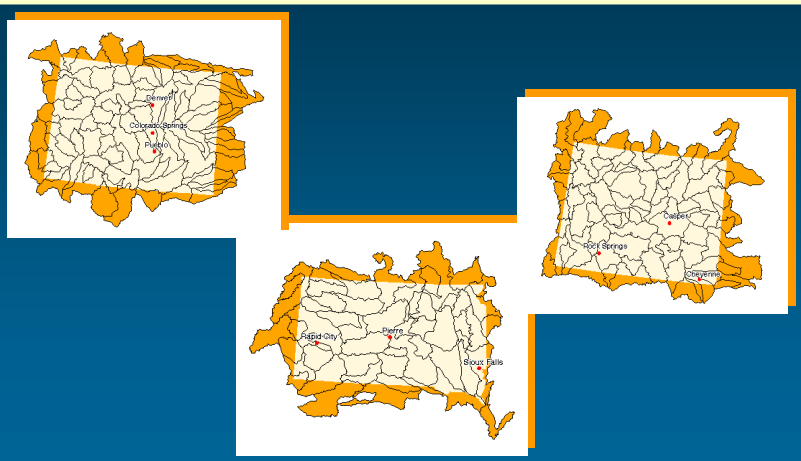
- Map illustrating opportunities for **satellite management** (Kansas).

Watersheds



- **Watershed boundaries** can give guidance to regionalization to the water industry.
- **Watershed management** is favored from the environmental resource perspective.
- In **Great Britain,** privatization of water utilities was preceded in an unrelated move by the formation of ten regional water systems delineated loosely by watershed boundaries.

State Watersheds

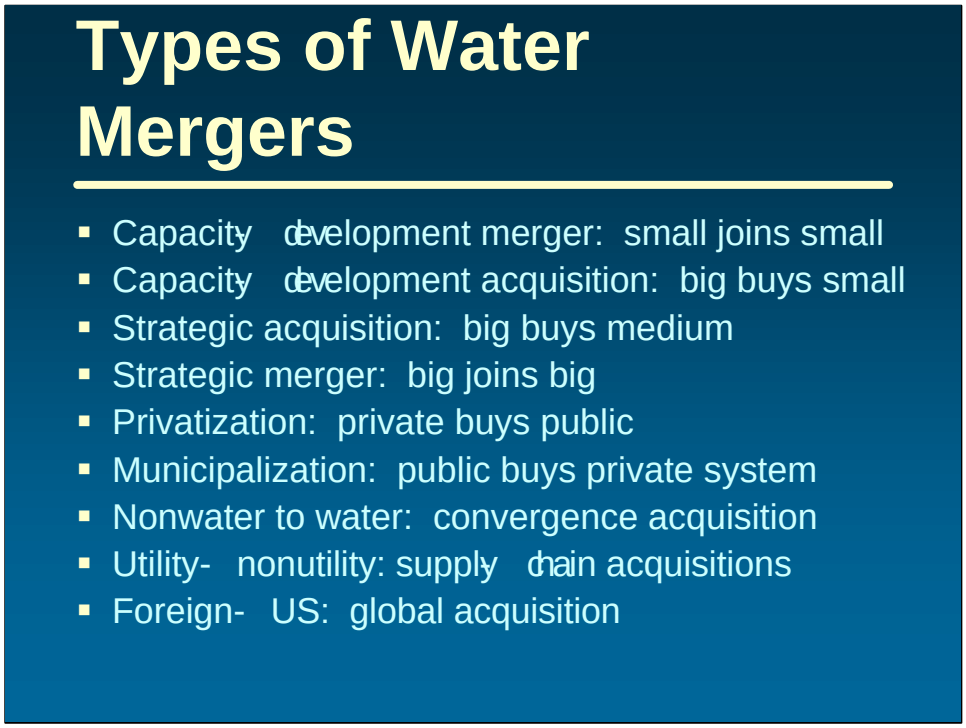


- **State watershed maps** from EPA's Surf Your Watershed (http://www.epa.gov/surf).

Regionalization in Great Britain

- A top-down approach to regionalization
- Ten large regional systems loosely organized around watersheds (1980s)
- Privatized in a separate historical event (1990s)
- Price-cap form of economic regulation (single regulator)
- British firms are now global competitors

- Great Britain implemented a top-down approach to **regionalization.**
- Britain's **ten large regional systems** were loosely organized around watersheds (1980s).
- The water utilities were **privatized** in a separate historical event under the Thatcher administration (1990s).
- Water utilities in the U.K. are subject to **economic regulation** by a single national regulator (OFWAT) using price-cap regulation.
- British water companies are now **global competitors** in the water business; a few are owned by foreign companies (French and German).



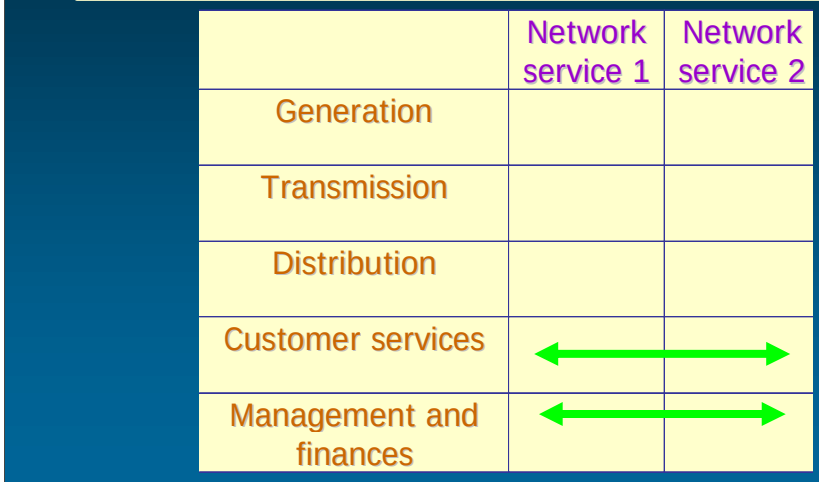
- Various types of **mergers and acquisitions** are taking place in the water industry (each has a different purpose or motivation):
  - Capacity-development merger: small joins small
  - Capacity-development acquisition: big buys small
  - Strategic acquisition: big buys medium
  - Strategic merger: big joins big
  - Privatization: private buys public
  - Municipalization: public buys private system
  - Nonwater to water: convergence acquisition
  - Utility - nonutility: supply-chain acquisitions
  - Foreign - US: global acquisition

- Some of the **new players** in the water industry include:
  - Utility holding companies;
  - Energy utilities;
  - Converged utilities;
  - Nonutility companies; and
  - Foreign interests.
- Some recent **mega-mergers** in the water business include the purchase of investor-owned utilities by very large foreign-owned companies.

- As an example, the **global** reach of Vivendi (ONDEO) in terms of owning and/or managing water utilities and related enterprises is expansive. Vivendi is a part owner of Philadelphia Suburban Water Company.
- While **American Water Works** serves approximately ten million customers in the U.S., Vivendi serves 100 million customers in 100 countries across the globe.
- **Other large players** include Suez (Lyonnaise des Eaux), German's RWE, and the privatized British water companies.
- **Globalization** raises a number of interesting public policy issues for the water sector, particularly in light of complex holding company relationships and security issues.

- **Convergence** refers to the merger of different utilities, such as electricity and water utilities.
- Convergence is premised on the expectation that **scale or scope economies** will be realized.
- The opportunity to exploit **shared skills** and expertise also is expected.
- Potential **synergies** is operations can be another reason for convergence (technological opportunities, as in the case of hydroelectric power or combined water and wastewater management).
- A multi-service utility can provide customers with **one-stop shopping** and an integrated bill.

Convergence

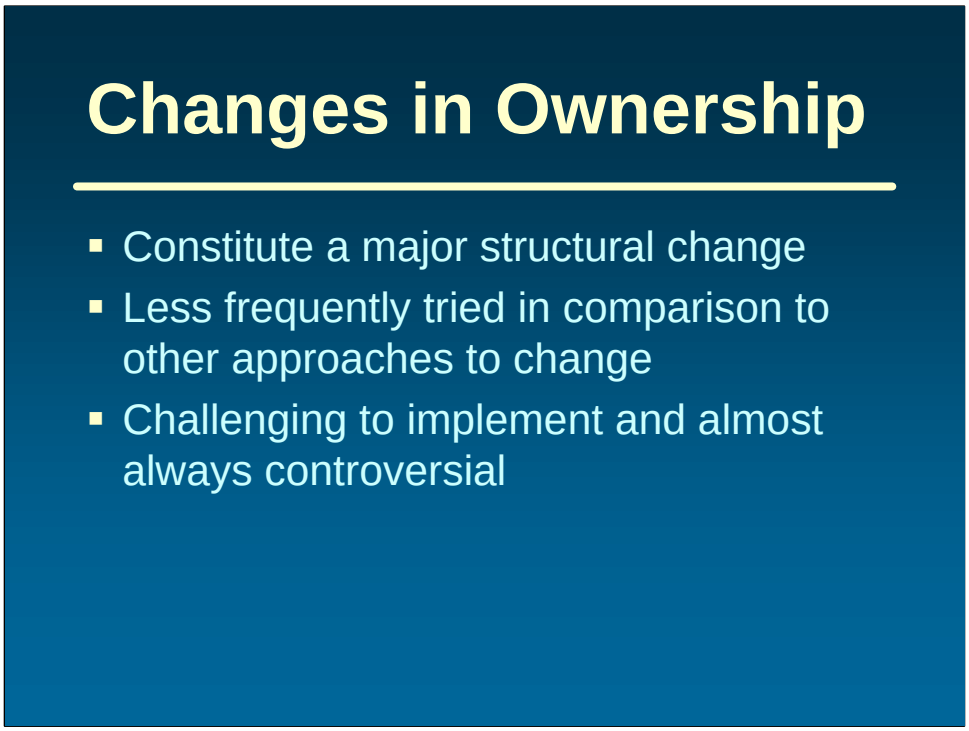


- **Convergence** is the process of joining functions across two or more utilities or network services.
- In paper mergers, **water** may be just another "division" (scale economies only) – water often is not really viewed as a core business.
- **Synergy opportunities** between water and other utilities are low in telecommunications, moderate in energy, and high in terms of water and wastewater services.
- Despite synergies, however, **water and wastewater** utilities are not well integrated – even when owned and operated by the same municipality.
- Examples of converged **private** systems include Duquesne (Aquasource), Enron (Azurix), and NiSource (Indianapolis Water Company); the latter two have "deconverged."
- Examples of converged **public** systems include Los Angeles DWP, Colorado Springs, Colorado, and Springfield, Missouri.

Economies v. Synergies

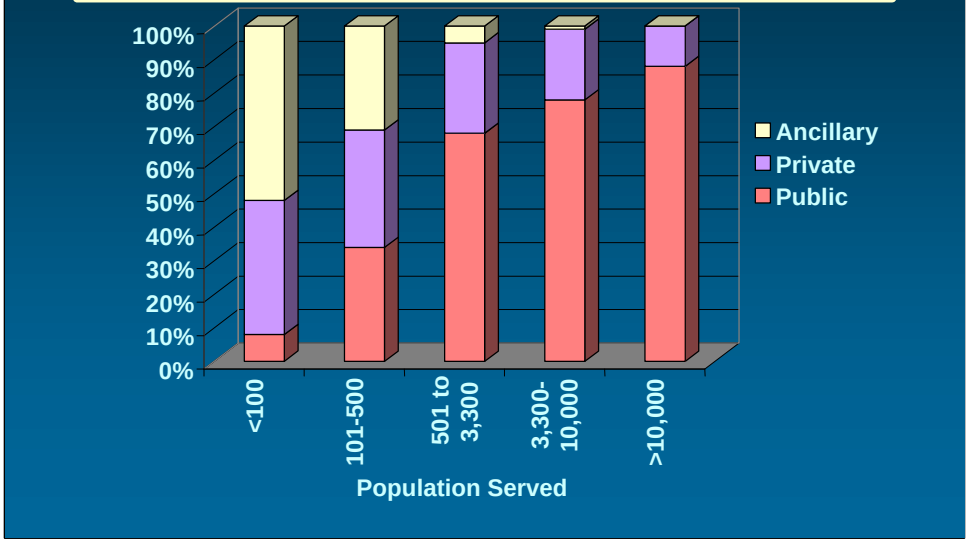
- Scale economies: bigger
  - More units, lower unit cost of production
- Scope economies: broader
  - Service A plus Service B provided at lower total cost of production (optimization)
- Synergies: better
  - Realization of technological opportunities by providing Service A and Service B

- The term **synergies** is often (mis)used to mean scale or scope economies
- **Synergies** are more than simply scale economies (lower unit cost of production).
- **Scale economies** concern unit cost of production.
- **Scope economies** concern optimization through joint production.
- Synergies go further by realizing **technological opportunities** that would otherwise not be possible (for example, fuel switching).

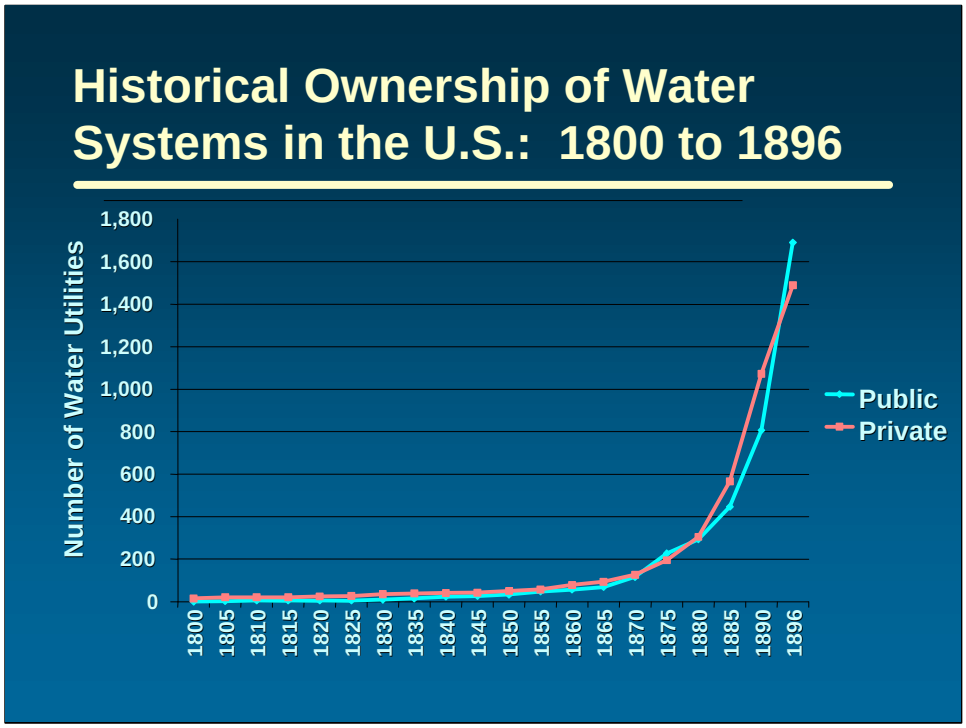


- Changes in water system **ownership:**
  - Constitute a major **structural change;**
  - **Are less frequently** tried in comparison to other approaches to change; and
  - **Are challenging** to implement and almost always controversial.

System Ownership by Size Category



- **Public ownership** dominates the water industry, particularly in terms of the larger systems.
- **Ancillary and private** ownership is concentrated in the smaller system categories, while public ownership dominates the larger system categories.
- **Ancillary** water systems provide water service as an ancillary function to their principal business, such as mobile home park systems.



- For the water industry's **first century** in the United States, public and private ownership grew hand in hand.
- Today, **municipalities** dominate the water industry; most large cities operate water or public works departments.
- However, the **private sector** also plays an important role in terms of both owning and operating water systems.

Basic Types of Water Systems

- **Three basic types** of water systems in terms of ownership are:
  - **Public.** Water systems owned by units of local government.
  - **Nonprofit.** Systems run on a nonprofit or not-for-profit basis.
  - **Private.** Systems owned and operated by the private sector on a for-profit basis.

Publicly Owned Systems

- **Municipalities.** City operated water systems, often managed as a municipal department
- **Counties.** County operated water systems, often managed as a county department
- **Districts and authorities.** Systems organized as separate local government units expressly for the purpose of providing water service

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Nonprofit Water Systems

- **Nonprofit corporation.** A legally constituted nonprofit or not-for-profit corporation
- **Cooperatives.** A nonprofit system formed to meet the needs of a nongovernmental community
- **Homeowners' associations.** A nonprofit system formed to meet the needs of a group of homeowners

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Privately Owned Systems

- **Single owner.** A water utility with a private owner that is not publicly traded
- **Publicly traded.** A water utility that usually operates multiple systems and is publicly traded (issues stock)
- **Holding company/multi-State utility.** A water utility organized as a holding company that operates multiple utility companies, usually in several States

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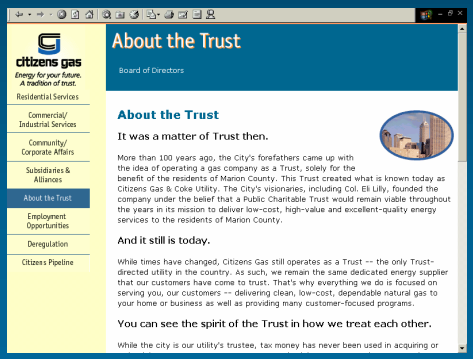
Hybrid: Municipal Corporation

- Wholly owned government corporation
- Louisville Water Company

- **Hybrid** models can be found.
- An example is the **Louisville Water Company,** a wholly owned municipal corporation.
- A similar example is **Epcor,** which serves the City of Edmonton, Canada, which is the company's sole shareholder.

Hybrid: Public Trust

- Assets placed in a public trust
- Citizens Gas Company



- **Hybrid** models can be found.
- An example is the Citizens Gas Company of Indianapolis, for which assets are held by a Public Charitable **Trust.**
- “More than 100 years ago, the City's forefathers came up with the idea of operating a gas company as a Trust, solely for the benefit of the residents of Marion County. This Trust created what is known today as Citizens Gas & Coke Utility. The City's visionaries, including Col. Eli Lilly, founded the company under the belief that a Public Charitable Trust would remain viable throughout the years in its mission to deliver low-cost, high-value and excellent-quality energy services to the residents of Marion County. “ [http://www.citizensgas.com/default.htm]

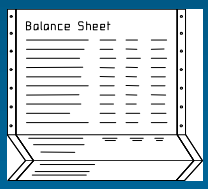
Asset Transfers

- Major reorganization (conversion)
- Mergers
- Acquisitions
- Municipalization
- Privatization

- Ownership changes involve a **transfer of assets** through
  - **Major reorganization** (conversion of the utility, such as incorporation);
  - **Mergers** among utilities;
  - **Acquisitions** of smaller systems by larger utilities;
  - **Municipalization** or the transfer of private assets to local government; or
  - **Privatization** or the transfer of municipal assets to the private sector.

Privatization: Asset Ownership

- Investor ownership
- Use of private capital for major projects
- Limited (structured) competition
- State economic regulation by public utility commissions



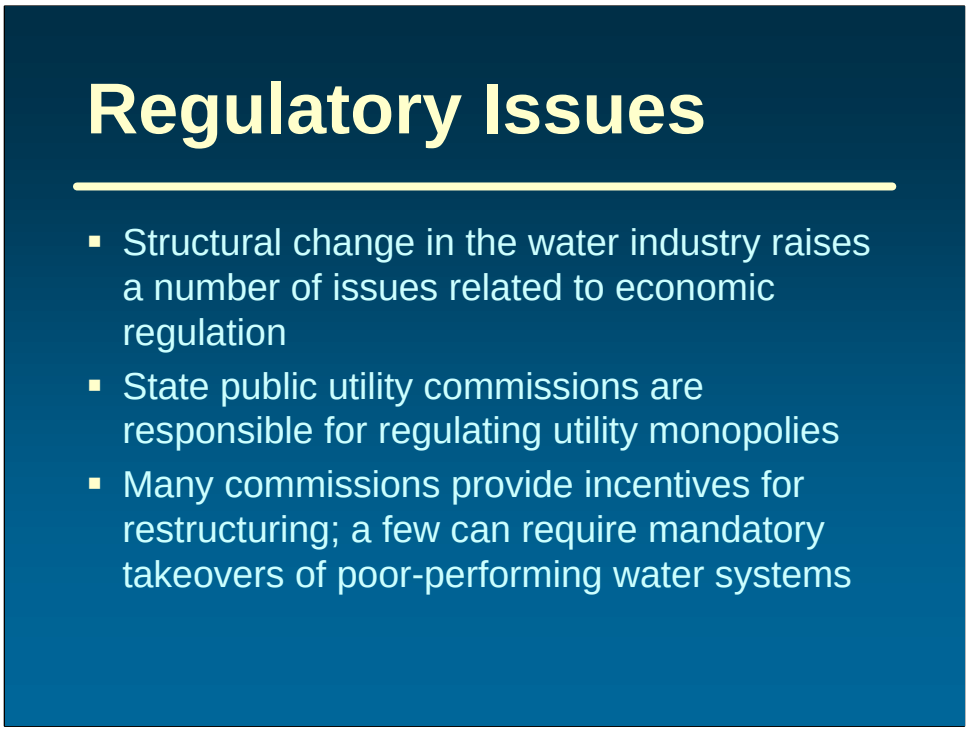
- Privatization through **asset ownership** involves:
  - **Investor ownership** (although only a few are publicly traded);
  - Use of **private capital** for major projects;
  - **Limited** (structured) competition; and
  - State economic **regulation** by public utility commissions.

Privatization: Contract Operations

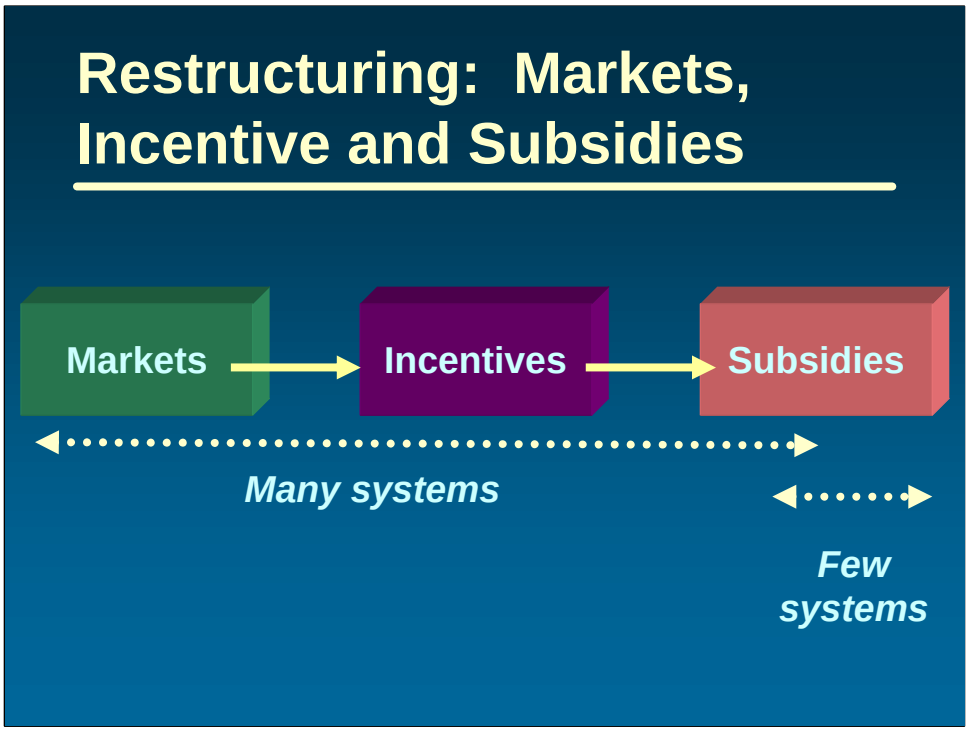
- Public ownership with “delegated” management
- Limited use of private capital for major projects
- Short-term competition for contracts
- Public ownership and the competitive market “substitute” for regulation (little review by States)

- Privatization in the form of **contract operations** involves:
  - Public ownership with **“delegated”** management;
  - **Limited use** of private capital for major projects;
  - **Short-term competition** for contracts; and
  - **Public ownership** and the competitive market “substitute” for regulation, with little review by the States; the New Jersey Board of Public Utilities is one of the few state agencies with authority to review private contracts.

- Both ownership and contract management offer certain **advantages,** as well as disadvantages.
- The chief advantages of **private ownership** are the use of private investment and the longevity of utility companies, potential for regionalization and consolidation, and accountability via independent oversight.
- The chief advantages of **contract management** are efficiency and expertise, lower cost of capital (municipal financing and subsidies), and preservation of local control.



- Structural change in the water industry raises a number of issues related to **economic regulation.**
- State **public utility commissions** are responsible for regulating utility monopolies.
- Several states and the federal government are active in **promoting beneficial consolidation** of the water industry.
- Specific **regulatory tools** used in some states include general policy statements, acquisition adjustments, rate-of-return incentives, consolidated rates (single-tariff pricing), mandatory takeover provisions, and regionalization. Also, regulatory climate in general can affect structural change in the water industry in terms of the incentives or disincentives for investor ownership.
- Restructuring also is encouraged through various provisions of the **1996 Safe Drinking Water Act** (particularly the capacity development effort).



- **Markets** may take care of many water systems in terms of restructuring.
- Financial and other **incentives** may be needed to encourage or accelerate the pace of restructuring.
- For the few systems that are essentially unsustainable, and for which market and incentive solutions are inadequate or infeasible, **subsidies** may be needed to ensure the provision of safe drinking water (particularly in the case of isolated, impoverished areas).

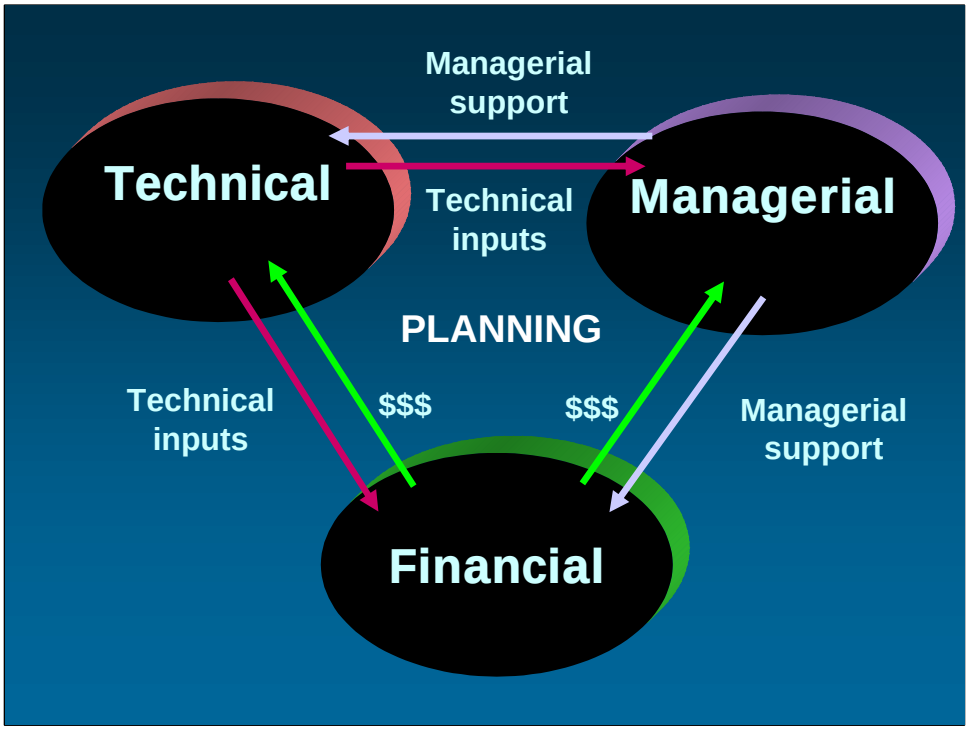
Strategic Planning for Small Water Systems

- **Strategic planning** can help water systems of all sizes enhance managerial capacity and improve overall performance.

Types of Water System Plans

- 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

- Water systems can prepared various types of **plans:**
  - Business plan
  - Financial plan
  - Management plan
  - Water resource plan (permitting)
  - Contingency/emergency-response plan (Y2K, terrorism)
  - Capital facility plan
  - Operation and maintenance plan
  - Watershed plan
  - Integrated resource plan
  - Strategic plan (purposive, comprehensive, and adaptive)



- **Planning** helps tie together the three essential elements of capacity.
- Each of the elements of capacity is intrinsically **related** to the others:
  - Both technical and managerial capacity depend on **financial resources**.
  - Both technical and financial capacity depend on **managerial support**.
  - Both managerial and financial capacity depend on **technical inputs**.
- Attention to these **linkages** is part of capacity development.

- **Strategic planning** can help water systems develop technical, financial, and managerial capacity
- Planning also can **further the goals** of capacity development:
  - To ensure consistent compliance with drinking water standards;
  - To enhance water system performance; and
  - To promote continuous improvement.
- The ability to prepare a basic business plan is a **key indicator** of a utility's managerial capacity because planning encourages self-assessment, goal-setting, and strategic thinking.
- Many states have incorporated **planning requirements** in their capacity-development policies.

What is Strategic Planning?

- A disciplined effort to guide an organization in terms of its purpose, structure, and functions
- Strategic planning is goal-oriented, comprehensive, and adaptive

- **Strategic planning** can be defined as a disciplined effort to guide an organization in terms of its purpose, structure, and functions.
- Strategic planning is **goal-oriented, comprehensive, and adaptive.**

Key Planning Steps

1. Specify mission and goals
2. Identify challenges and opportunities
3. Assess system capacity
4. Define service roles
5. Identify strategic options
6. Choose the strategy
7. Implement and monitor

- **Strategic planning** for water systems involves:
  - Specifying the system's goals and objectives relative to its mission.
  - Identifying external influences (challenges and opportunities).
  - Assessing internal capacity (technical, financial, managerial)
  - Defining the water system's service roles across the planning horizon.
  - Analyzing strategic options for achieving compliance and other goals.
  - Implementing the preferred planning alternative.
  - Monitoring and evaluating outcomes, making adjustments as needed.

1. Specify Goals and Objectives

- What is the water system's mission?
- What values guide the water system?
- What are the system's immediate and long-term goals?
- Are values and goals established in an open and participatory process (employees, customers, other stakeholders)?

- Step 1. **Specify Goals and Objectives**
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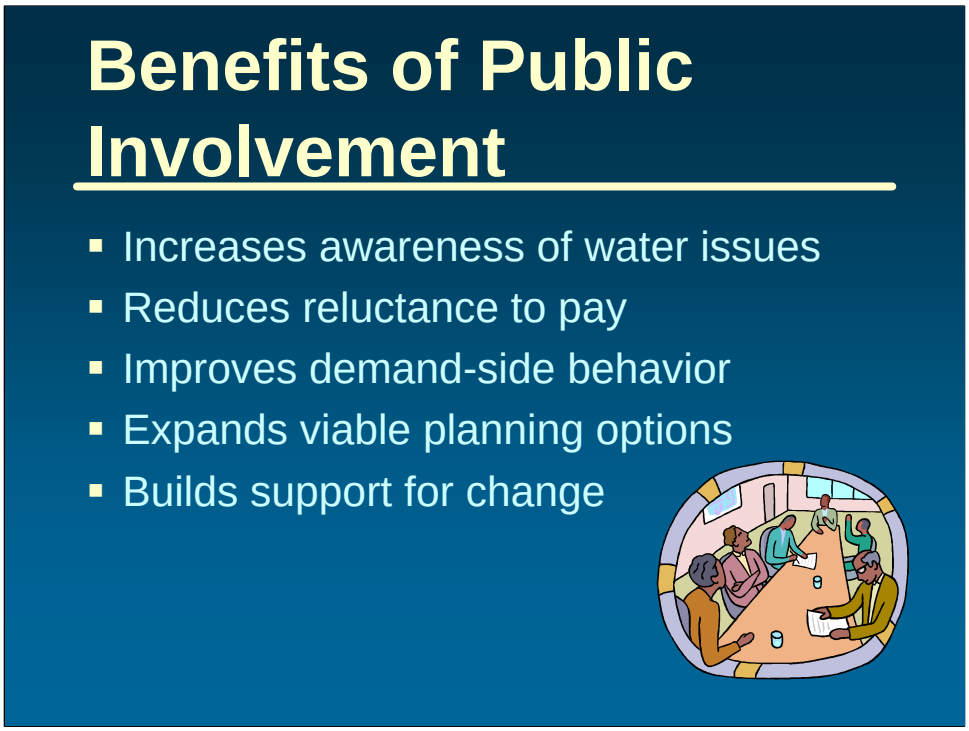
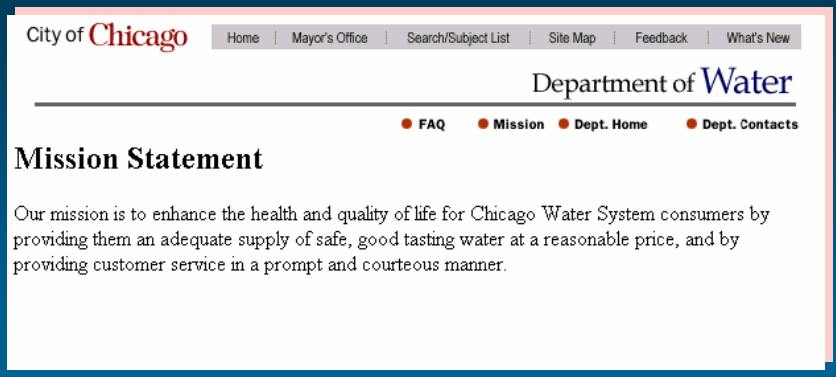
- Water systems may have a number **goals:**
  - Compliance with applicable standards;
  - Safe and reliable water source;
  - Efficient management and operations;
  - Affordable rates for water customers;
  - Excellent customer service; or
  - Other water system goals?



- **Involving the public** in the planning process can:
  - Increase awareness of water issues;
  - Reduce reluctance to pay;
  - Improve demand-side behavior;
  - Expand viable planning options; and
  - Build support for change,

Mission Statement

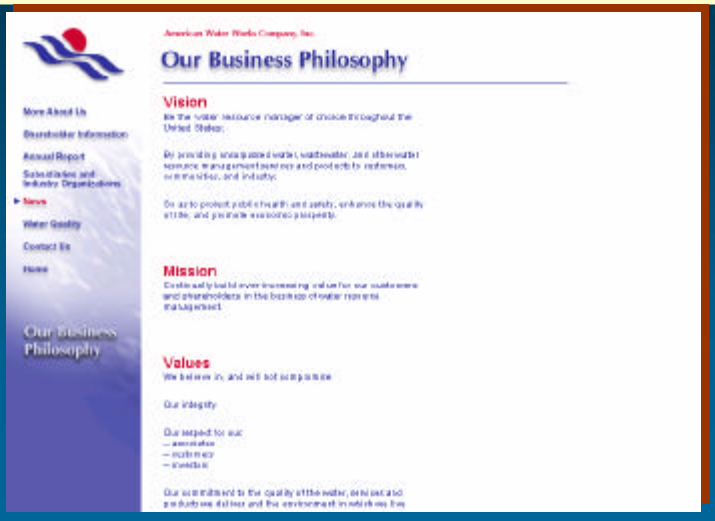


- Sample mission statement (City of Chicago Department of Water).

Mission Statement

- Sample mission statement (Pinellas County Utilities).

Mission Statement



- Sample mission statement (American Water Works Company).

Exercise

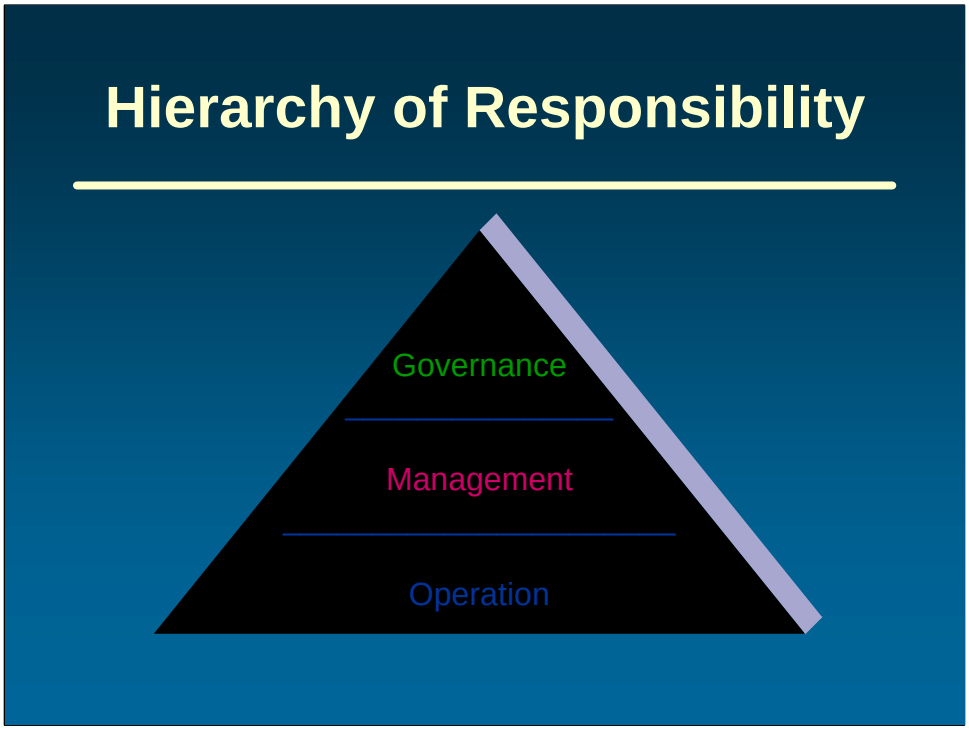
- Design a concise mission statement for a small water system
- "The Mission of the XYZ Water System is…."
- Specify some *measurable* goals for the system (short term and long term) that support its mission

- Here is an **exercise** related to strategic planning.
- **Design** a concise mission statement for a small water system.
- Specify some **measurable goals** for the system (short term and long term) that support its mission.

2. Assess Structure and Roles

- What service functions does the water system presently provide?
- What operational tasks does the water system perform?
- What is the role of the water system for each service function?

- Step 2. **Assess Structure and Roles**
  - How is the water system structured (hierarchy of responsibility)?
  - What service functions does the water system presently provide?
  - What operational tasks does the water system perform?
  - What is the role of the water system for each service function?



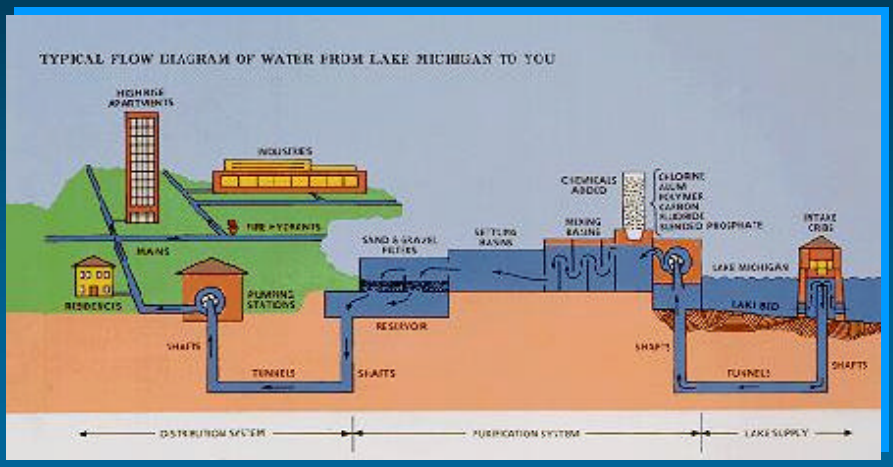
- Water system's structural character encompasses a **hierarchy of responsibility:**
  - **Governance** is at the top of the hierarchy because it refers to the ultimate responsibility for the water system, which may rest with a board of directors. Governance focuses on *accountability.*
  - **Management** is the link between governance and actual operations; strategic planning is a management function. Management focuses on *responsibility*
  - **Operation** involves the direct performance of functional tasks. Operation focuses *performance.*
- A **vertically integrated system** traditionally assumes all three roles. Assuming a role, however, involves choice; not every system must assume every role for every service function.
- Over time, **roles can change and evolve**, and responsibilities for some service roles and functions can be assigned to others.
- **Strategic planning** provides an opportunity to reflect on the hierarchy of responsibility.

The Big Questions

- Do you want to be in the water business?
- If so, what role do you want to play?

- The **big questions** for the water system manager are “Do you want to be in the water business” and “If so, what role do you want to play”?

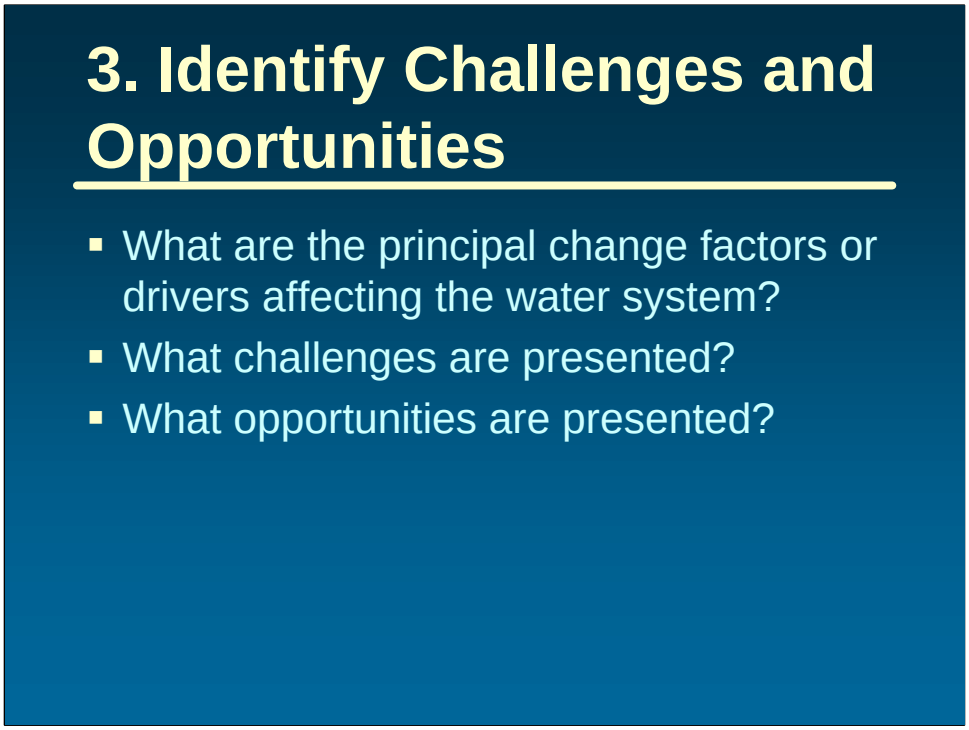
Utility Service Functions



- Water utilities are similar to other utilities in terms of **basic utility functions:** production, transmission, and distribution.
- Water utilities tend to be **vertically integrated;** that is, the utility operates all functions
- Water is like **natural gas** in terms of the potential for storage, but unlike natural gas in terms of the cost of transmission.
- Water also requires a high level of **treatment** in order to meet customers expectations for quality, as well as federal and state drinking water standards.
- Water **distribution networks** consist of about 29 million miles of pipe (a type of storage).
- The distribution system is designed to provide service **"on demand,"** which among other things provides water flows needed for fire protection.

- Operating a water system involves a number of **tasks** organized by **function:**
  - **Source-water development and protection**
    - Routine O&M, regulatory compliance monitoring
    - Patrol, inspect, and maintain watershed
    - Implement Source Water Protection program
    - Asset maintenance (major rehabilitation, replacement
  - **Drinking water treatment**
    - Routine O&M, regulatory compliance monitoring
    - Laboratory analysis
    - Process optimization
    - Asset Maintenance (major rehabilitation)
  - **Treated water storage and distribution**
    - Routine O&M (flushing, valve exercising), monitoring
    - Leak detection and repair
    - Major installation, rehabilitation, and repair
    - Storage tank inspection, repair, rehabilitation
  - **Retail customer services**
    - Installing new connections
    - Meter installation, change-out, rehabilitation
    - Meter reading, billing, and collections
    - Customer services, education, and information
  - **Regulatory monitoring and reporting**
    - Reports to EPA, primacy agency
    - Consumer confidence reports

- Water systems can assume **alternative service roles,** such as:
  - **Purchasing** wholesale treated water and maintain the distribution function;
  - Forming a **cooperative** to construct a regional water supply and treatment facility;
  - Entering an agreement to deploy a **satellite manager** for treatment plants;
  - **Contracting operations** to another water system or service provider;
  - **Merging** ownership and operations with another water system; or
  - Contracting with a private firm or another utility for **retail services** (such as customer billing).
- The **strategic planning process** can be used to help water utilities explore alternative organizational structures and service roles.



- Step 3. **Identify Challenges and Opportunities**
  - What are the principal change factors or drivers affecting the water system?
  - What challenges are presented?
  - What opportunities are presented?

Sample of Challenges

- Compliance with regulatory standards
- Changing demographics
- Supply quality or quantity issues
- Infrastructure needs
- Financial pressures

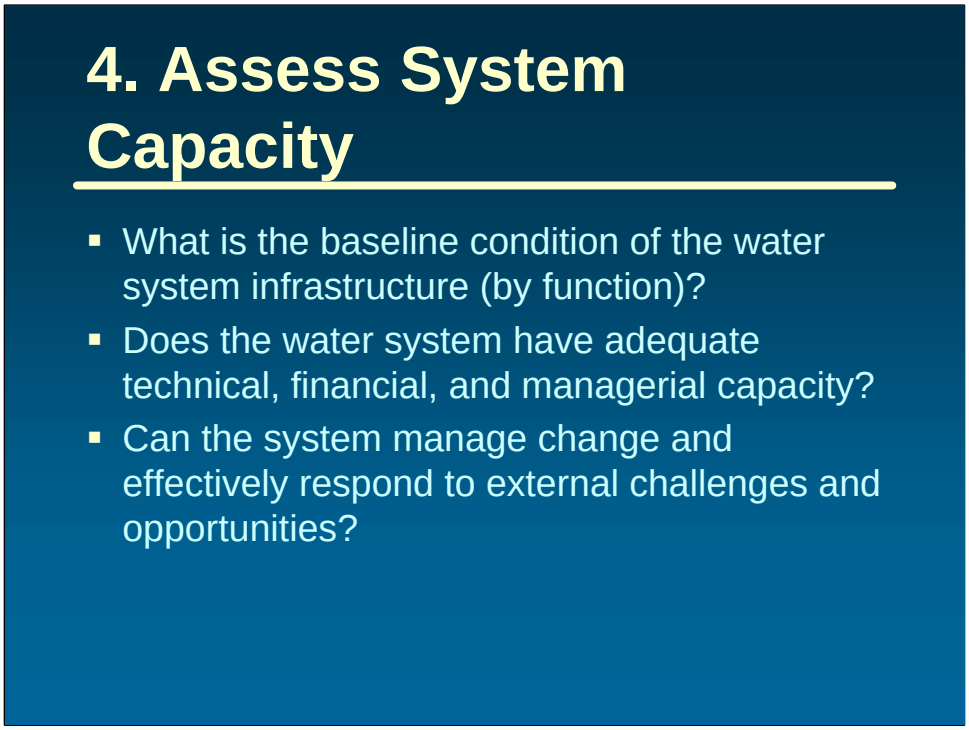
- **Challenges** for water systems include:
  - Compliance with regulatory standards;
  - Changing demographics;
  - Supply quality or quantity issues;
  - Infrastructure needs; and
  - Financial pressures.

Regulations Affecting Water Systems

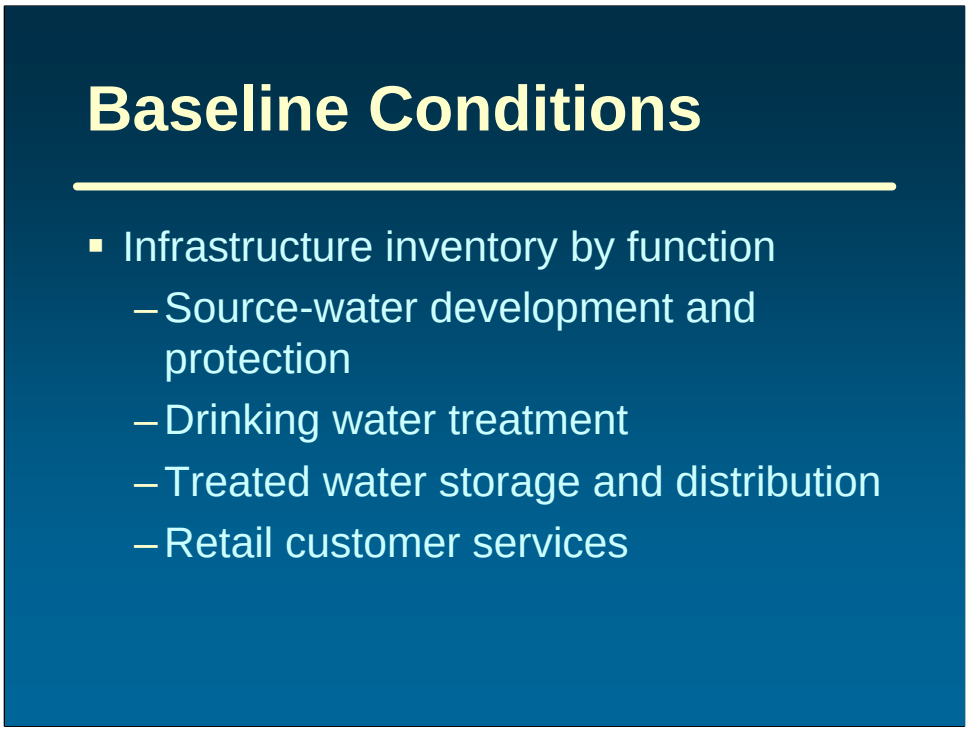
- Safe Drinking Water Act
- Clean Water Act
- Water quantity regulations
- Environmental regulation
- Occupational safety and health
- Americans with Disabilities Act
- Historic preservation
- Minority business programs
- Economic regulation (PUC)
- Requirements of other agencies

- Water systems must comply with a number of **Federal, State, and local regulatory standards** pursuant to:
  - Safe Drinking Water Act
  - Clean Water Act
  - Water quantity regulations
  - Environmental regulation
  - Occupational safety and health
  - Americans with Disabilities Act
  - Historic preservation
  - Minority business regulation
  - Economic regulation (PUC)
  - Requirements of other agencies
    - Local (health departments)
    - State (finance agencies)
    - Federal (Corps of Engineers, Bureau of Reclamation)

- **Opportunities** for water systems include:
  - Training opportunities;
  - Technical assistance;
  - Grant and loan programs;
  - Partnerships and alliances; and
  - Change in ownership or operations.



- Step 4. **Assess System Capacity**
  - What is the baseline condition of the water system infrastructure (by function)?
  - Does the water system have adequate technical, financial, and managerial capacity?
  - Can the system manage change and effectively respond to external challenges and opportunities?

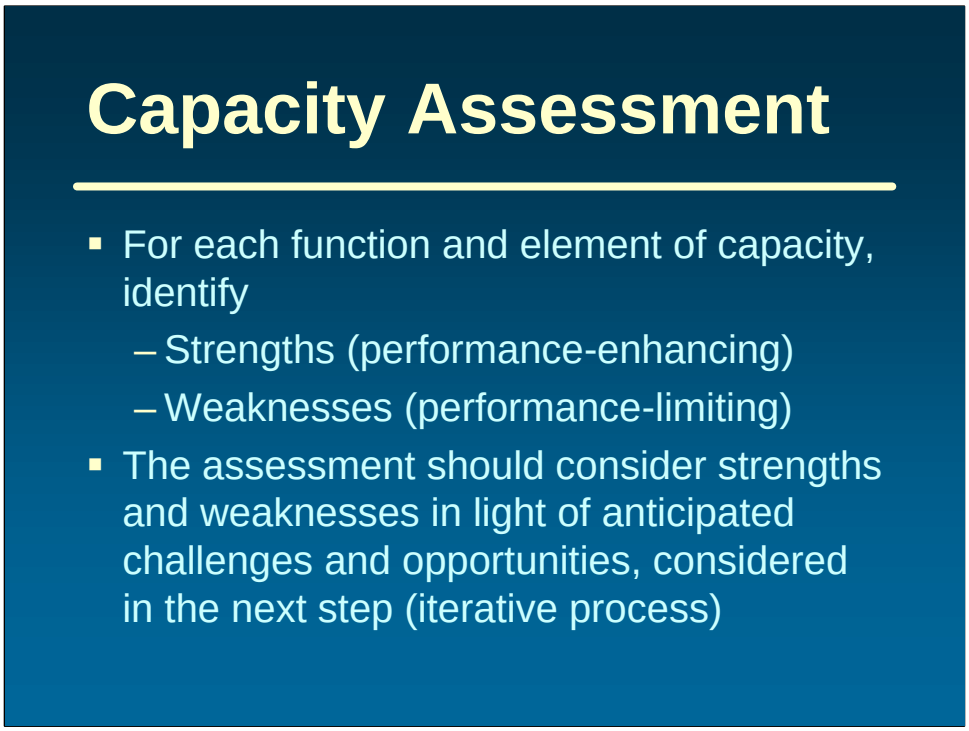


- The water system manager should prepare an **inventory** of the physical infrastructure, organized according to functional areas:
  - Source-water development and protection;
  - Drinking water treatment;
  - Treated water storage and distribution; and
  - Retail customer services.
- The infrastructure inventory is especially important to the assessment of **technical capacity.**

Assessment Matrix

		Technical	Financial	Managerial
Function	A			
Function	B			
Function	C			

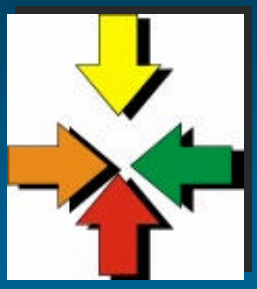
- An **assessment matrix** can be used used to assess capacity across the functions that water utilities perform.



- For each function and element of capacity, the water manager should **identify:**
  - **Strengths** (performance-enhancing factors), and
  - **Weaknesses** (performance-limiting factors).
- The assessment should consider strengths and weaknesses in light of anticipated **challenges and opportunities** for the water system (considered in the previous step).
- This is an **iterative** part of the planning process.

5. Identify Strategic Options

- What strategic options are available to the system for achieving its goals?
- What benefits and costs are associated with each option?
- How are the system's technological and structural options interrelated?

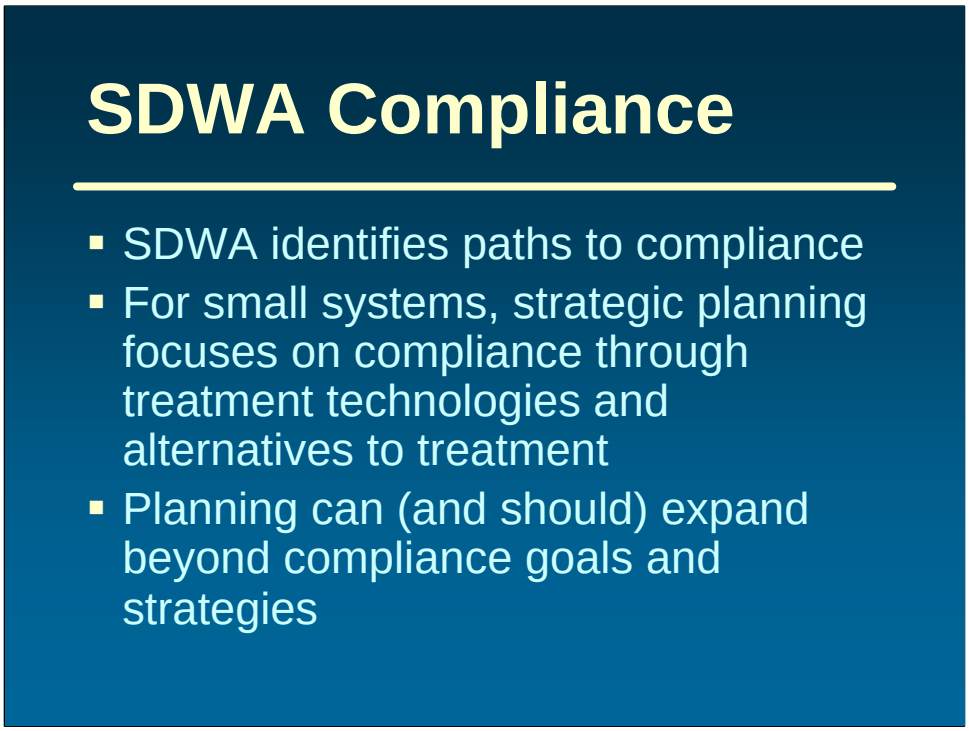


- Step 5. **Identify Strategic Options**
  - What strategic options are available to the system for achieving its goals?
  - What benefits and costs are associated with each option?
  - How are the system's technological and structural options interrelated?

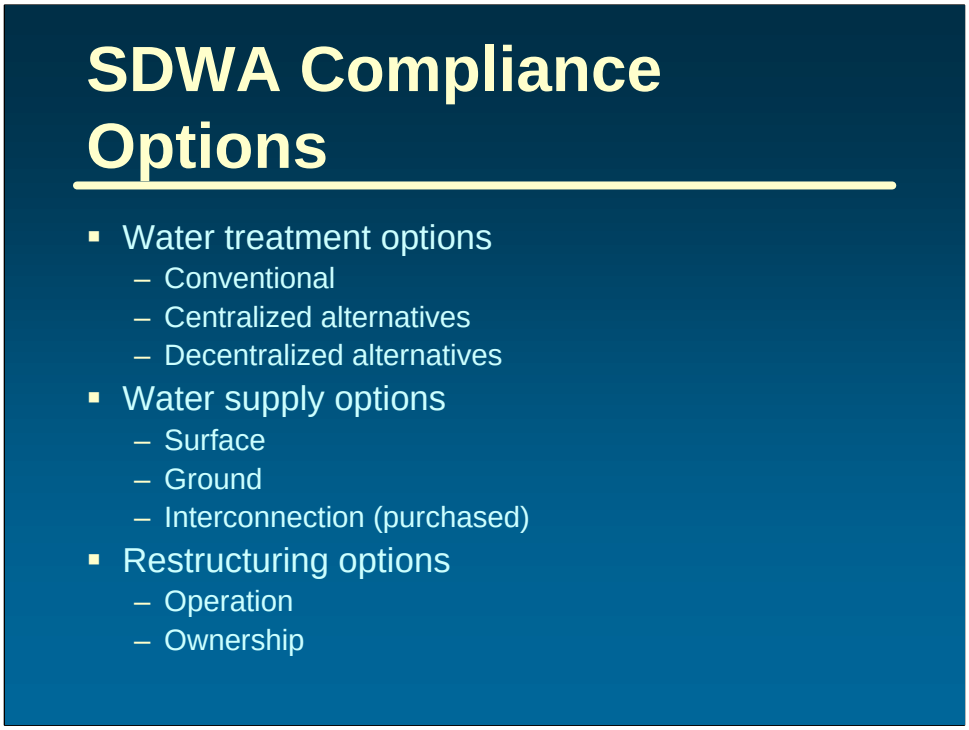
Planning Applications Strategic Options

- SDWA compliance
- Aesthetic and quality issues
- Customer service issues
- Supply shortages or unreliability
- Infrastructure challenges
- Conservation and efficiency
- Other challenges

- The **basic planning model** can be used in a number of applications, in addition to SDWA compliance, to identify strategic options:
  - Aesthetic and quality issues;
  - Customer service issues;
  - Supply shortages or unreliability;
  - Infrastructure challenges;
  - Conservation and efficiency; and
  - Other challenges.



- SDWA identifies **paths to compliance.**
- For small systems, strategic planning focuses on **compliance** through treatment technologies and alternatives to treatment.
- Planning can (and should) expand **beyond compliance** goals and strategies.

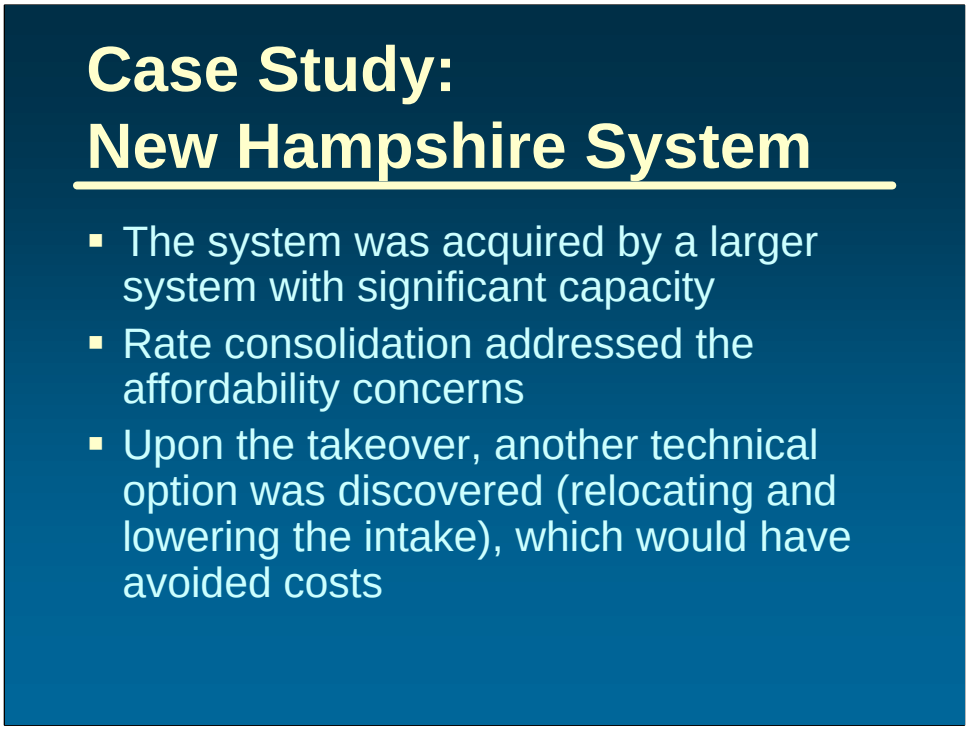


- **Compliance options** include:
  - Water **treatment** options
    - Conventional
    - Centralized alternatives
    - Decentralized alternatives
  - Water **supply** options
    - Surface
    - Ground
    - Interconnection (purchased)
  - **Restructuring** options
    - Operation
    - Ownership

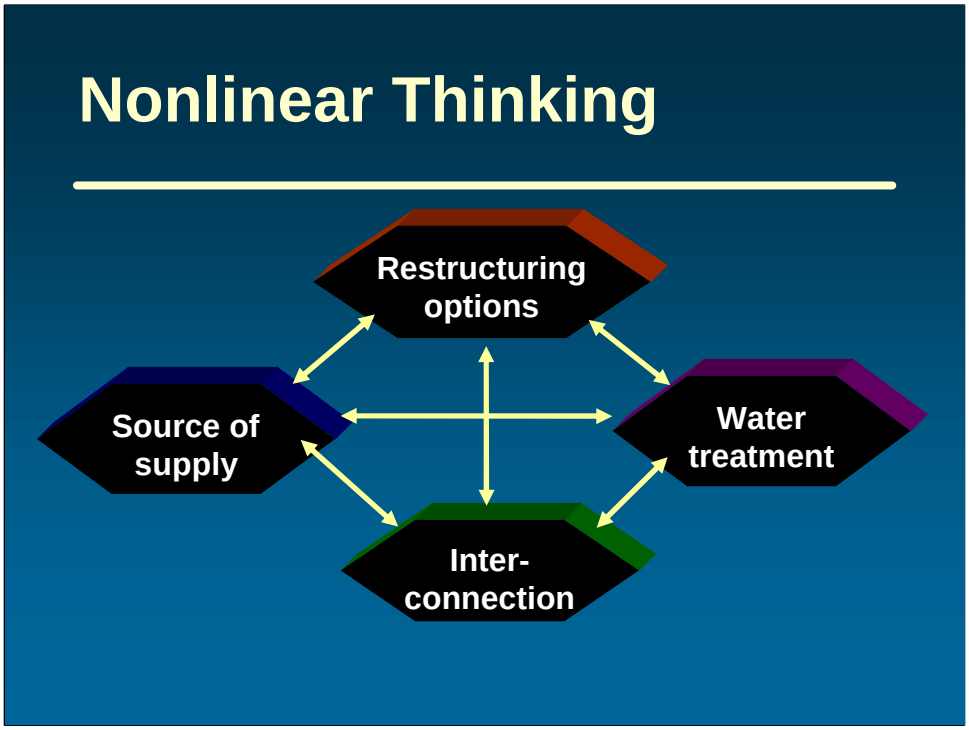
Case Study: New Hampshire System

- A very small system with limited technical, financial, and managerial capacity
- The system faced technical difficulties and enforcement actions because of surface water quality
- The system invested in expensive treatment option, resulting in financial difficulty and high rates

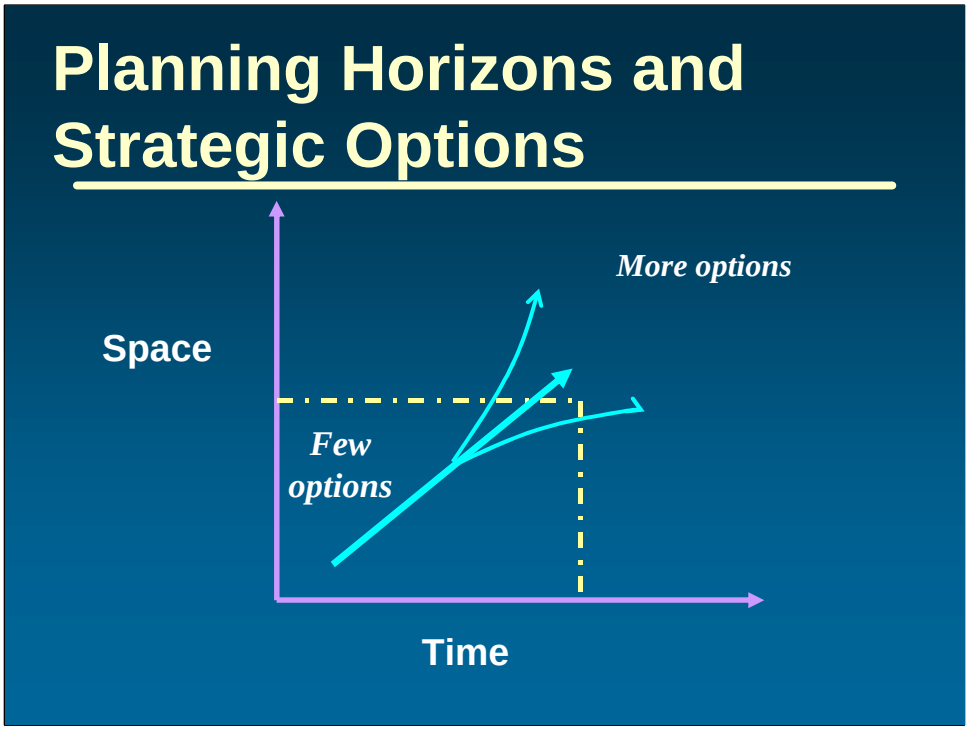
- This **case study** considers the following "real-life" situation:
  - A **very small system** with limited technical, financial, and managerial capacity.
  - The system faced technical difficulties and **enforcement** actions because of surface water quality.
  - The system invested in **expensive** treatment option, resulting in financial difficulty and high rates.



- How the case was **resolved:**
  - The system was **acquired** by a larger system with significant capacity
  - **Rate consolidation** addressed the affordability concerns
  - Upon the takeover, **another technical option** was discovered (relocating and lowering the intake), which would have avoided costs



- When considering **strategic options**, water systems should strive for nonlinear thinking.
- In other words the various means of achieving compliance and other goals should be considered within a **long-term, comprehensive framework.**



- Analysts also should strive to expand the spatial and temporal **planning horizons.**
- By looking to longer term and regional solutions, **more opportunities** may be revealed in the planning process.

6. Choose a Strategy

- Which strategic option (or combination of options) can best provide the system's service roles and functions?
- How do options compare in terms of cost effectiveness?
- Which alternative is optimal in terms of the selection criteria?

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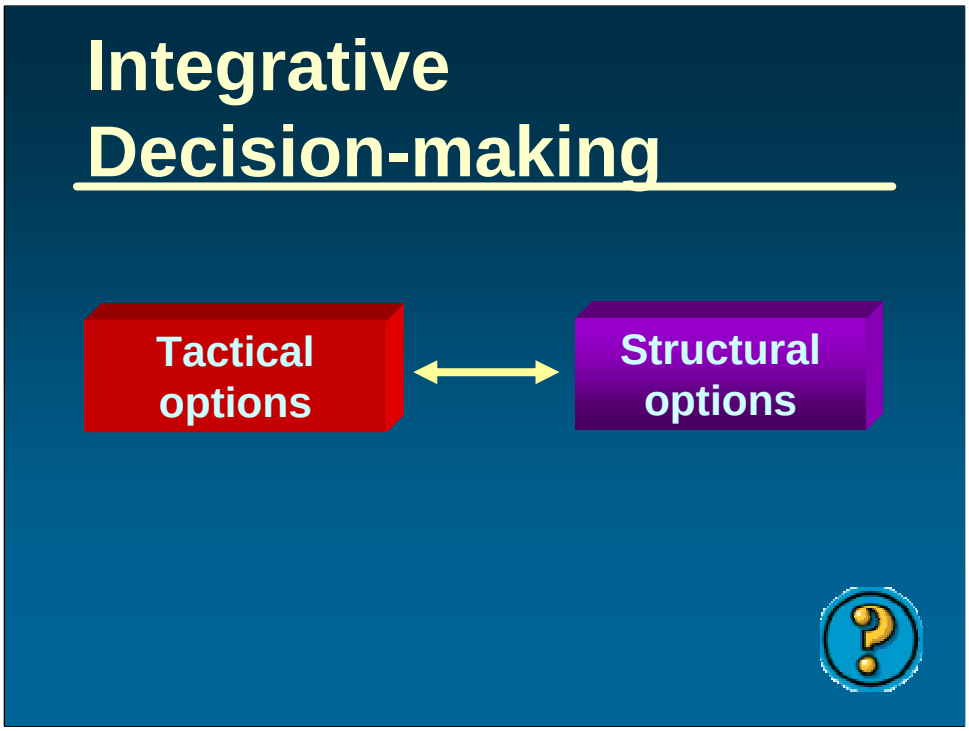
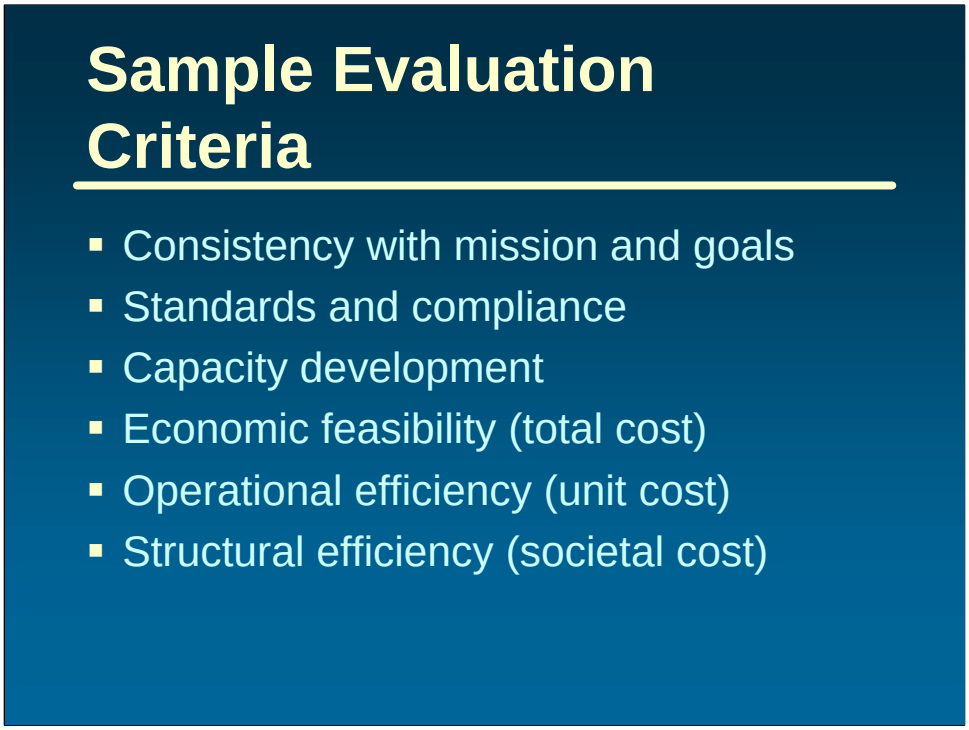
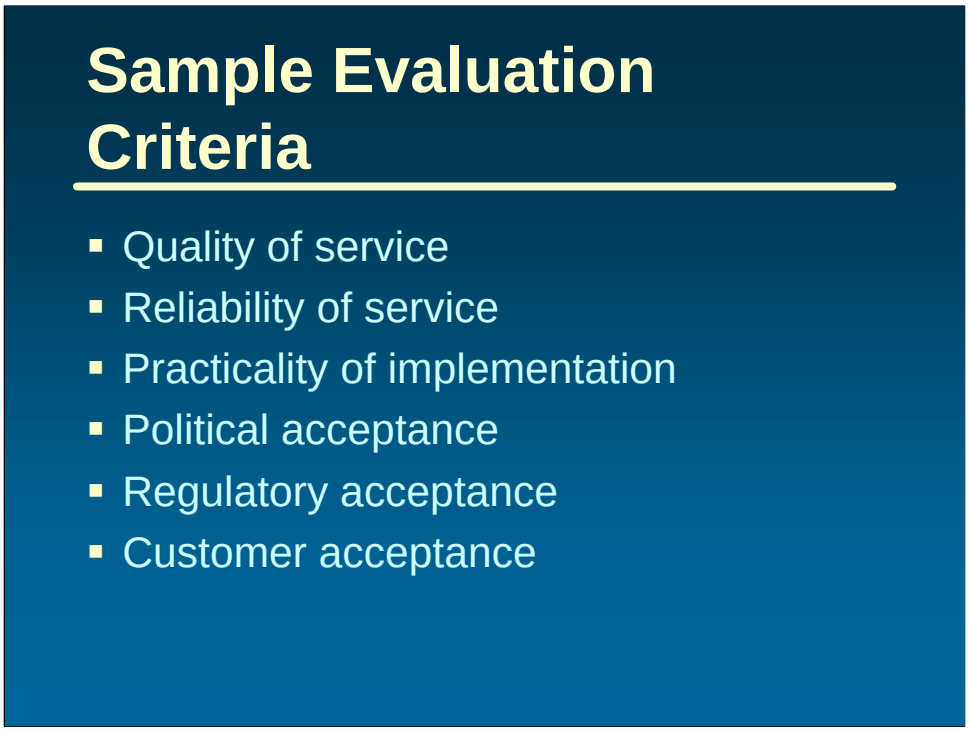


- **Integrative** decision-making involves the combination of tactical and structural options.
- **Tactical options** involve changes within the existing organizational structure.
- **Structural options** involve a fundamental change in the organizational structure.



- Sample **evaluation criteria** include:
  - Consistency with mission and goals;
  - Standards and compliance;
  - Capacity development;
  - Economic feasibility (total cost);
  - Operational efficiency (unit cost); and
  - Structural efficiency (societal cost).



- Sample **evaluation criteria** (continued):
  - Quality of service;
  - Reliability of service;
  - Practicality of implementation;
  - Political acceptance;
  - Regulatory acceptance; and
  - Customer acceptance.

Qualitative Assessment

	Option A	Option B	Option C
Criteria 1			
Criteria 2			
Criteria 3			

- **Qualitative assessment** involves simple scoring or ranking of options.

Cost Analysis

- Evaluate the cost effectiveness of alternatives (cost per unit)
- The cost of alternatives can be compared to a benchmark to estimate “avoided cost” (or “net benefit”)
- The benchmark often reflects the cost associated with the typical or conventional means of producing the desired benefit

- An **avoided-cost** analysis is a very useful resource planning tool for evaluating cost effectiveness ($/benefit) or net benefits (benefits-cost) of planning alternatives.
- The analysis holds **benefits constant** and compares the cost of alternatives to a benchmark (e.g., a supply or treatment option).
- The **avoided-cost benchmark** often reflects the cost associated with the typical or conventional means of producing the desired benefit.
- The difference between the typical option and a better option is the **cost avoided** by implementing the better option.

Exercise

- The cost of an evening movie ticket is $7.00
- What are the alternatives for seeing a movie?
- What is the avoided cost associated with the alternatives?
- What factors enter into the choice among the options?

- Here is an **exercise** to understand the concept of avoided cost:
  - The cost of an evening movie ticket is $7.00.
  - What are the alternatives for seeing a movie?
  - What is the avoided cost associated with the alternatives?
  - What factors enter into the choice among the options?

Exercise

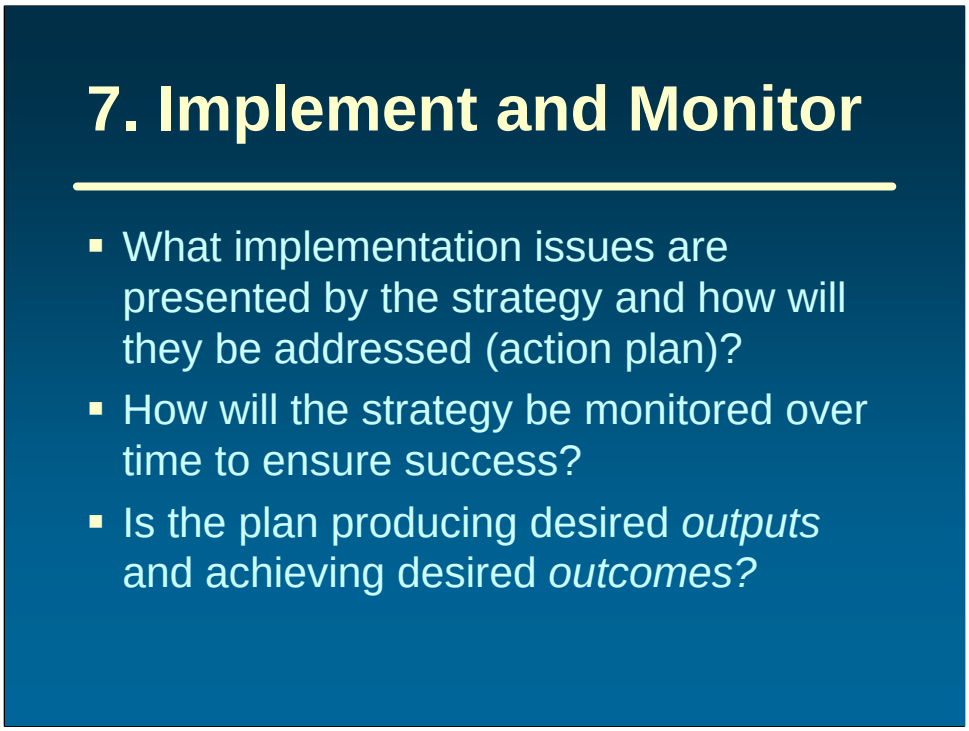
- The cost of conventional treatment is $3.50 per 1,000 gallons
- Consider the cost of:
  - Alternative treatment methods
  - Alternative source of supply
  - Interconnection
  - POU/POE devices
  - Bottled water
  - Other options?

- Here is an **exercise** related to avoided cost.
- The cost of **conventional treatment** is $3.50 per 1,000 gallons.
- Consider the **cost** of:
  - Alternative treatment methods;
  - Alternative source of supply;
  - Interconnection;
  - POU/POE devices;
  - Bottled water; and
  - Other options?
- **Another exercise** is to consider options for treating an aesthetic issue, such hardness, through central treatment versus treatment by individual households.

Optimization

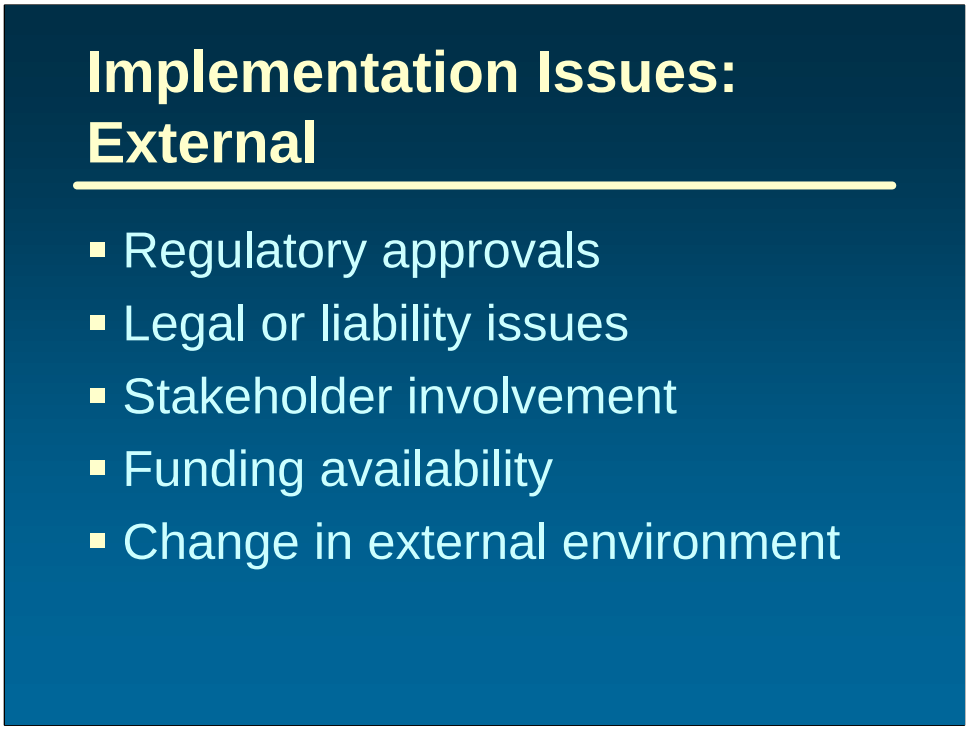
- Optimization involves choosing a planning strategy—the option or combination of options—that best meets the range of selection criteria

- **Optimization** involves choosing the planning strategy—the option or combination of options—that best meets the range of selection criteria.
- Optimization is **not about perfection** but about making an informed decision that is most consistent with the systems values and goals than the alternatives.



- Step 7. **Implement and Monitor**
  - What implementation issues are presented by the strategy and how will they be addressed?
  - How will the strategy be monitored over time to ensure success?
  - Is the plan producing desired *outputs* and achieving desired *outcomes?*
- The system should develop an **action plan** to guide implementation
  - Specify key dates and actions needed
  - Monitor progress over time

- **Internal** implementation issues include:
  - **Inertia.** Can the utility overcome inertia or resistance to change associated with uncertainty or other issues?
  - **Capacity.** Does the system have adequate technical, financial, and managerial resources for implementation?
  - **Leadership.** Is the leadership of the organization prepared for and committed to the implementation process?
  - **Organization.** Will implementation require organizational or personnel changes, including special training for technical or managerial staff members?
  - **Conflict and change.** Can internal organizational conflicts be managed?

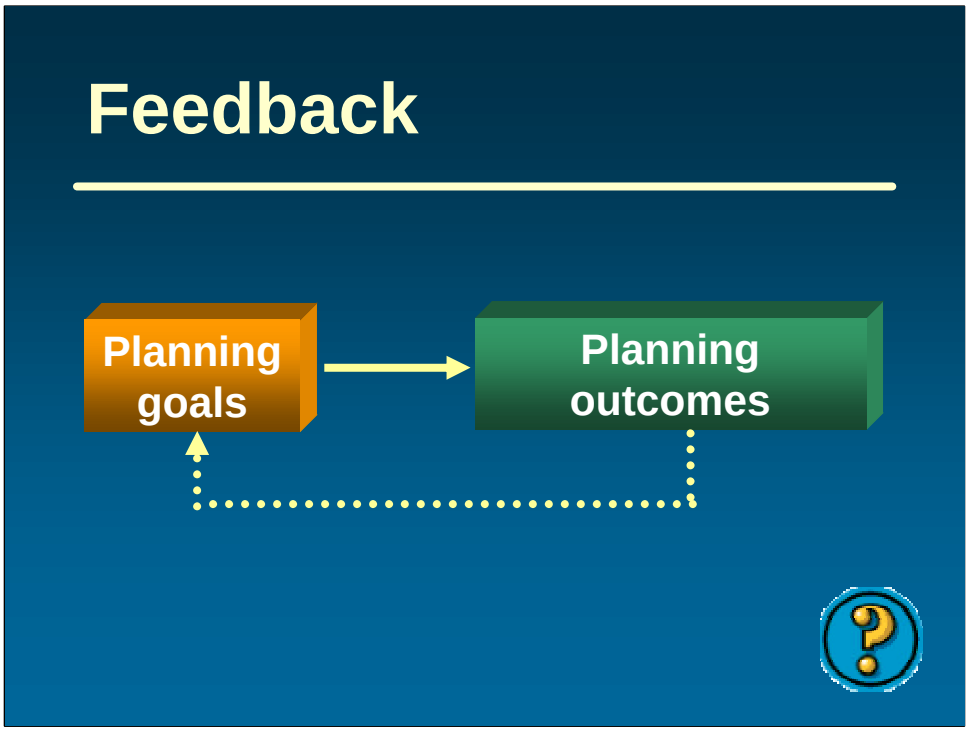


- **External** implementation issues include:
  - **Regulatory approvals.** Are environmental or economic regulatory approvals required, including certification or permitting?
  - **Legal.** Does implementation raise any special legal or liability issues?
  - **Stakeholders.** Will other stakeholders be informed and involved in implementation, and supportive of the process?
  - **Funding.** Is additional funding available for implementation from external public or private sources?
  - **External environment**. Will change and uncertainty in the external environmental (such as the economy) thwart implementation?

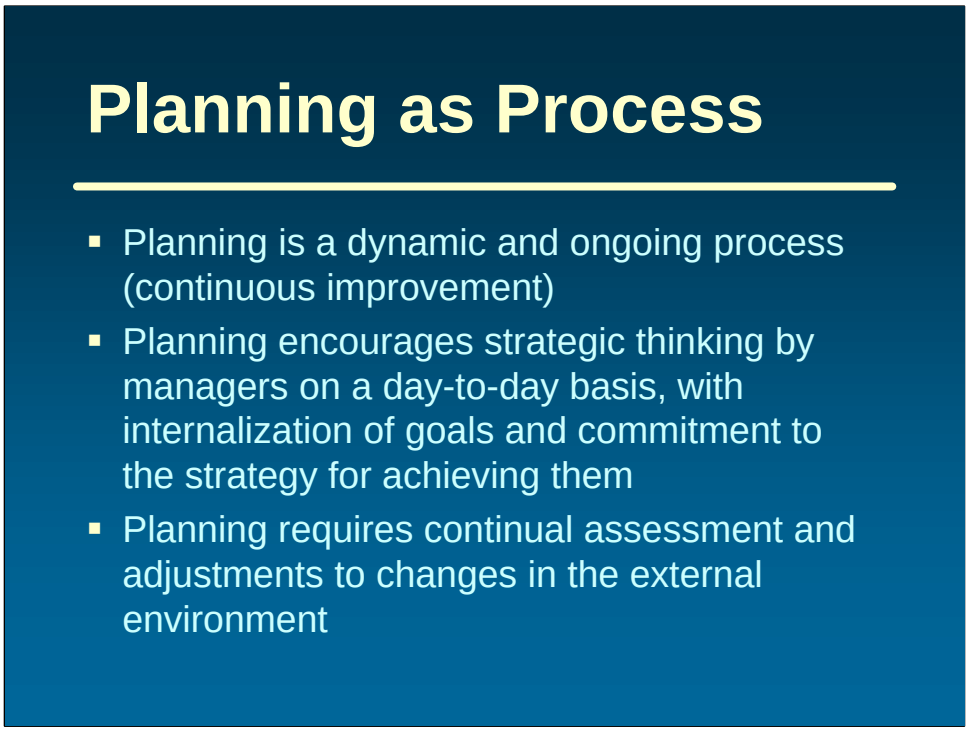
Outputs v. Outcomes

- Outputs are the actions that are taken in the course of implementing the plan
- Outcomes are the actual consequences of the strategy
  - Direct and indirect
  - Expected and unexpected
  - Intended and unintended
- Continuous improvement focuses on outcomes

- **Outputs** are the actions that taken in the course of implementing the plan.
- **Outcomes** are the actual consequences (or results) of the strategy:
  - Direct and indirect;
  - Expected and unexpected; and
  - Intended and unintended.
- **Example:** consumer confidence report versus consumer confidence (compliance with the rule versus efficacy in actually building confidence).
- **Continuous improvement** focuses not on outputs but outcomes.



- The **feedback** loop connects planning outcomes to the formulation of goals and supports the process of continuous improvement.
- **Measurable** goals are more readily evaluated.
- Participants are asked to discuss what water systems can do to ensure **successful planning outcomes.**



- 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 the strategy for achieving them.
- Planning requires **continual assessment and adjustments** to changes in the external environment.

Discussion and Conclusions