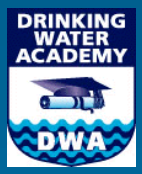
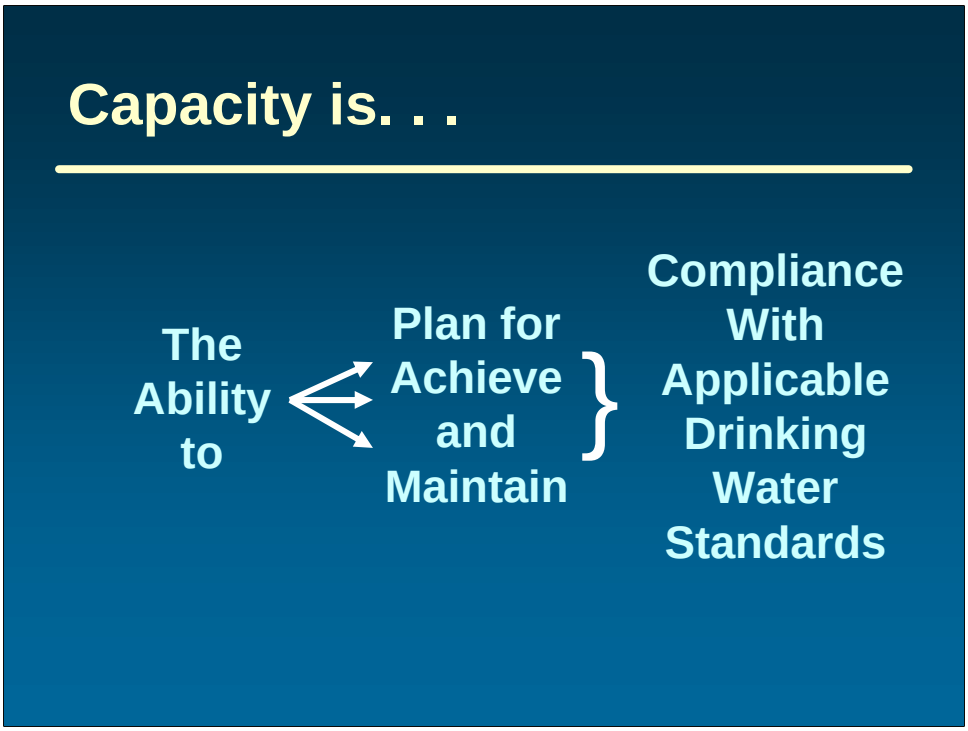
Capacity Development: An Introduction



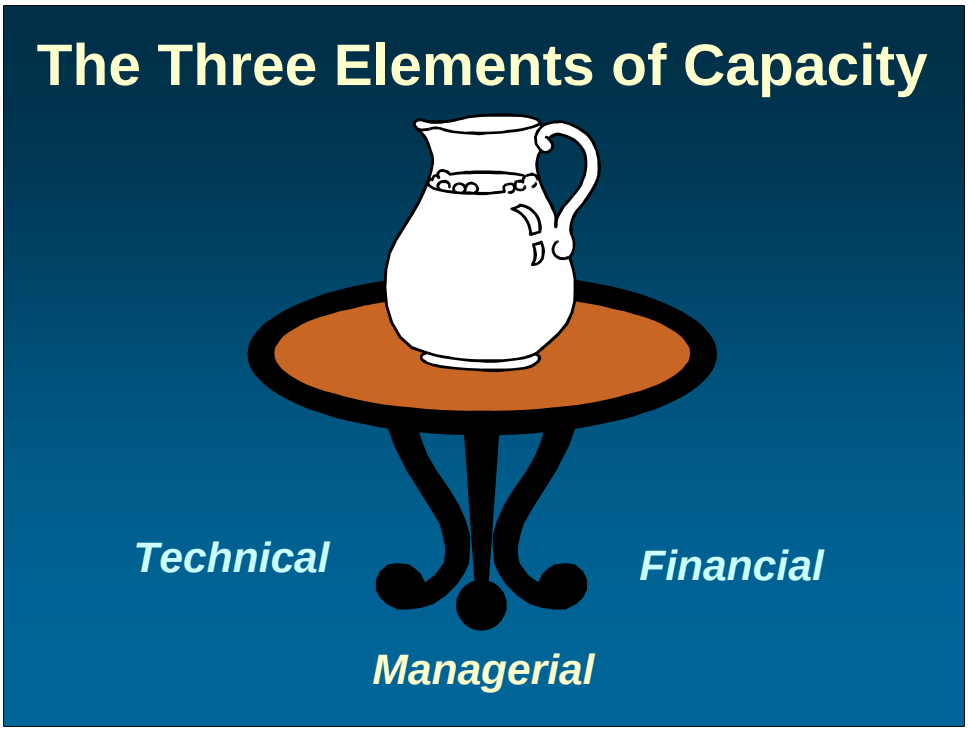
SDWA §1420 Capacity Development

- To receive their full Drinking Water State Revolving Fund (DWSRF) allotment, States must:
  - Ensure all **NEW** CWSs and all **NEW** NTNCWSs have adequate capacity before commencing operation
  - Implement a strategy to assist PWSs in acquiring and maintaining capacity

- There is a statutory basis for States to have comprehensive capacity development programs. The Safe Drinking Water Act (SDWA) Section 1420 outlines two programs that States must implement to receive their full Drinking Water State Revolving Fund (DWSRF) allotment.
- New System Program
  - States must ensure that all NEW community water systems (CWSs) and all NEW non-transient non-community water systems (NTNCWSs) commencing operation after October 1, 1999, have adequate technical, managerial, and financial capacity before commencing operation.
- Existing System Strategy
  - States will lose a percentage of the money they are otherwise allotted under the DWSRF program unless they are implementing a strategy to help all public water systems (PWSs) achieve and maintain capacity.
  - The States could have lost up to 10 percent in FY 2001 and 15 percent in FY 2002, and can lose 20 percent in FY 2003 and each year thereafter.



- 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 so that systems can provide safe and affordable water to their customers.
- 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 were introduced in the 1996 SDWA Amendments. Definitions and refinements were developed in EPA guidance documents with the broad-based input of stakeholders.

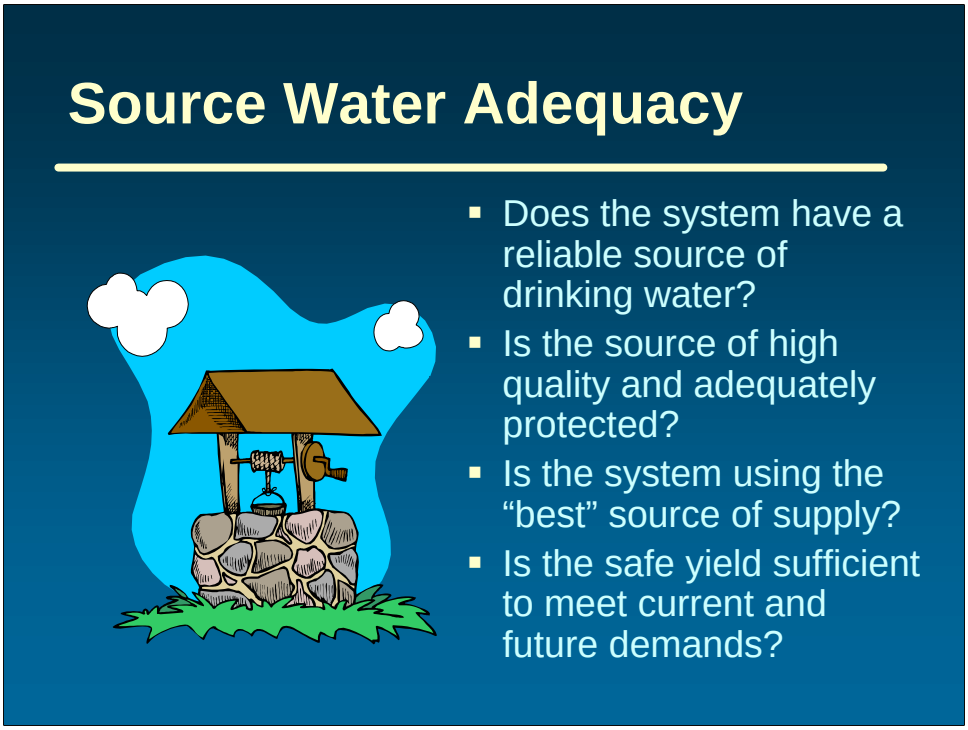


- The three elements of capacity are like the legs of a three-legged table. All three legs are essential to support the the table top, and all three legs must be attended to equally or the table will eventually topple over.

Elements of Technical Capacity

- Source water adequacy
- Infrastructure adequacy
- System operations

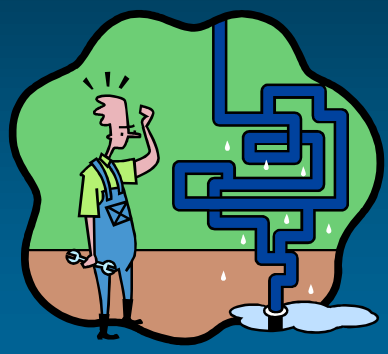
- The essential elements of technical capacity are:
  - Source water adequacy;
  - Infrastructure adequacy; and
  - System operations.
- These elements are further explained in the next several slides.



- Source water protection and adequacy means the system:
  - Has a reliable source of drinking water (adequate quantity);
  - That is of generally good quality;
  - Is adequately protected; and
  - The safe yield is sufficient to meet current and future demands.
- Generally, the system is using the "best" source of supply given the characteristics and demographics of the area.

Infrastructure Adequacy

- Can the system provide water that meets SDWA standards?
- What are the condition and life expectancy of infrastructure components?
- Does the system have a capital improvement plan?



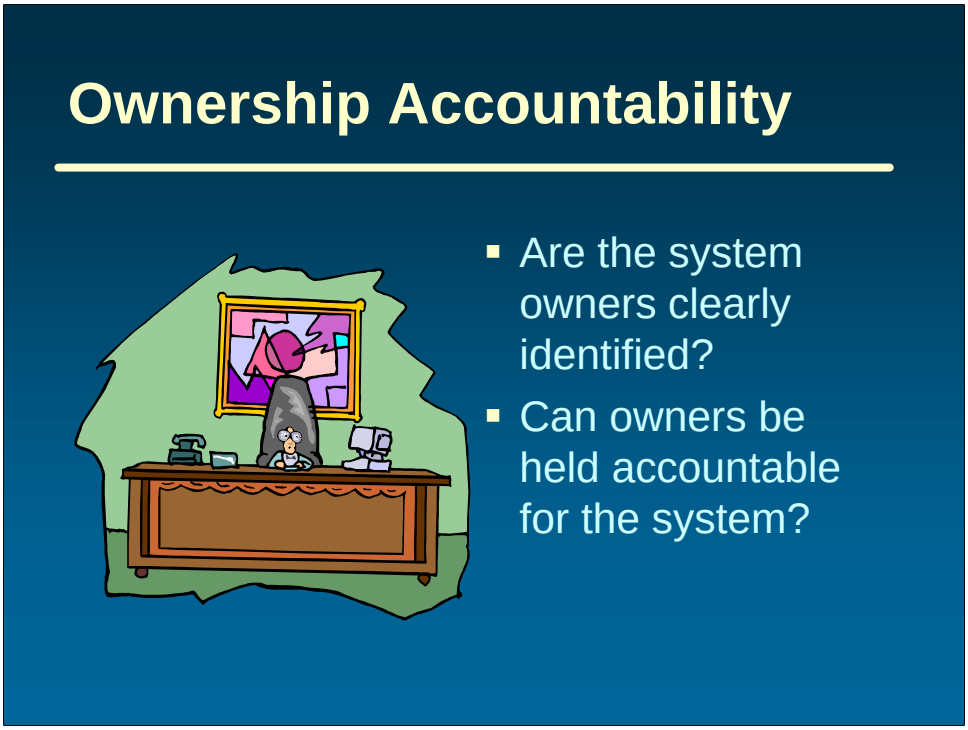
- Infrastructure adequacy and improvement means the system can provide water that meets SDWA standards because its infrastructure, from source to distribution, is in good condition and has not exceeded its useful life.
- This element also encompasses the development and implementation of a capital improvement plan to ensure that systems have planned for needed repairs and replacements of infrastructure components.

System Operations: Technical Knowledge and Implementation

- Is the operator certified?
- Does the operator know the drinking water standards and how to implement them?
- Does the operator understand the system's technical and operational characteristics?
- Does the system have an effective O & M program?

- A system that has developed adequate technical knowledge employs a certified operator who understands the benefits of public health protection, knows the applicable drinking water standards, understands the system's technical and operational characteristics, and is successfully implementing the system's operation and maintenance plan.
- In addition, the operator must not only know about the standards and the system, he must be able to implement and impart his knowledge. This means he can explain the operation of the treatment processes and the overall operation of the system, and can effectively implement this technical knowledge.

- The essential elements of managerial capacity are:
  - Ownership accountability;
  - Staffing and organization; and
  - Effective external linkages.
- These elements are further explained in the next several slides.



- Ownership accountability ensures that the system owners are clearly identified and can be held accountable for the system. Identification of roles and responsibilities can help prevent confusion, mistakes, and misunderstandings in the daily operation of the system.
- Accountability is essential for the system to continually operate effectively.

Staffing and Organization

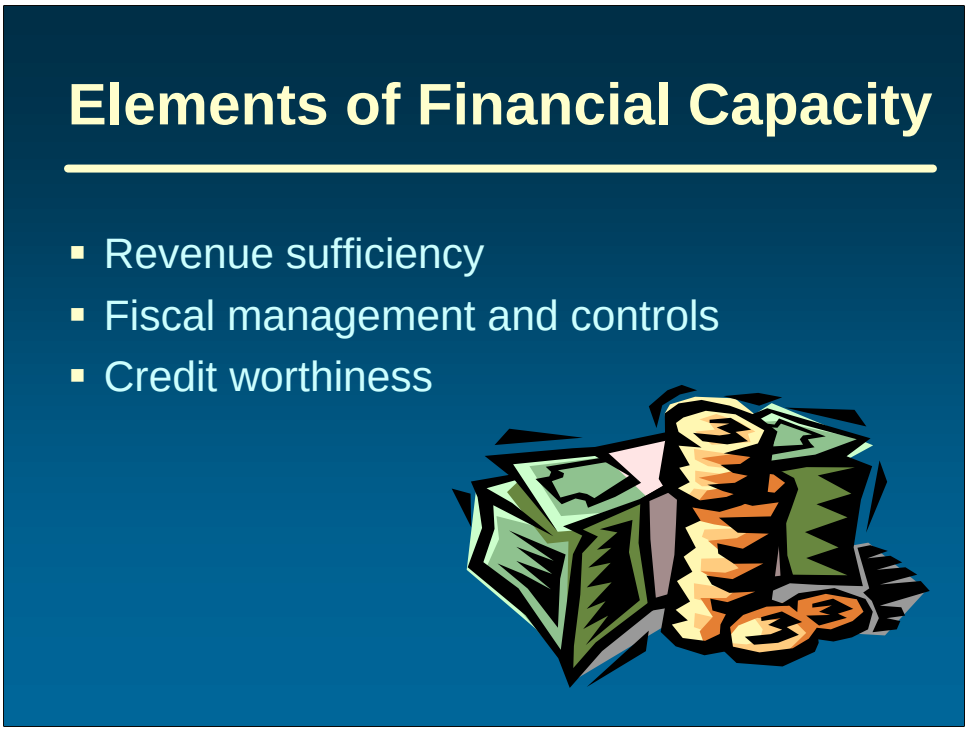
- Are operators and managers clearly identified?
- Is the system properly staffed and are staff appropriately trained?
- Do staff understand the regulatory requirements?

- As with ownership accountability, system operators and managers should be clearly identified and their roles and responsibilities should be clearly explained.
- One aspect of running an effective organization is ensuring that the system is properly staffed. This means personnel have adequate expertise to manage operations, they understand the regulatory requirements, and have the necessary licenses and certifications.
- Another important aspect of staffing and organization is ensuring the ongoing training of managers and operators.

Effective External Linkages

- Does the system's staff interact well with customers, regulators, and other entities?
- Is the staff aware of available external resources, such as technical and financial assistance?

- Water system staff need to interact regularly with their customers and with regulators. System personnel also need to know where to get technical or financial help. Building relationships with assistance providers, regulators, and water users will increase a system's ability to solve problems as they occur.
- A system with effective external linkages will know where to get needed technical and financial help and will be able to get that help because of established relationships with regulators, customers, and assistance providers.



- The essential elements of financial capacity are:
  - Revenue sufficiency;
  - Fiscal management and controls; and
  - Credit worthiness.
- These elements are further explained in the next several slides.

Revenue Sufficiency

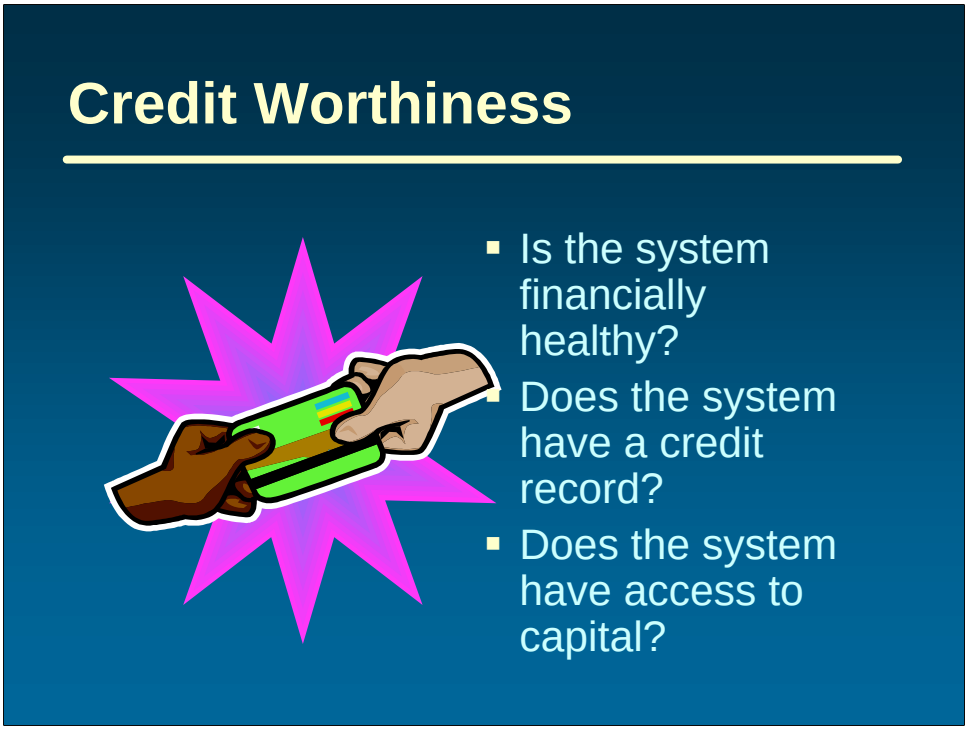
- Do revenues cover costs?
- Does the system charge an appropriate rate for water service?

- Revenue sufficiency is the cornerstone of a well run system. If revenues from rates and charges continually do not cover system costs, the system will eventually fail to make needed repairs. A system should know, and be able to measure, all costs and revenues. Rates should reflect the true cost of service.

Fiscal Management and Controls

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

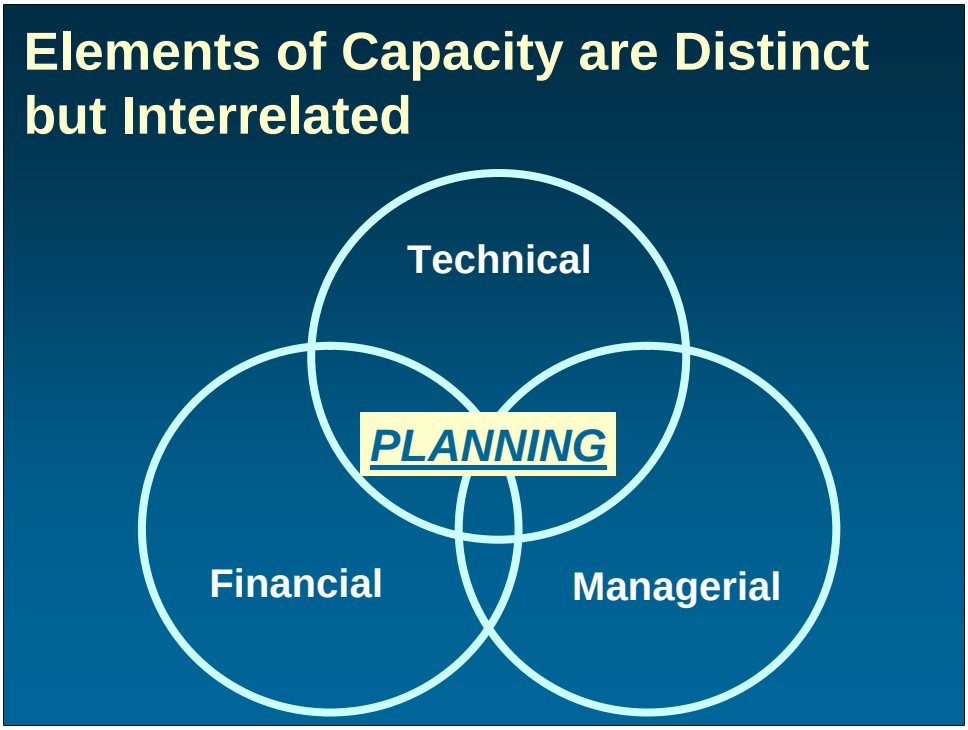
- Sound financial management allows a system to maintain efficient and effective operations. This includes keeping adequate books and records, using appropriate budgeting, accounting, and financial planning methods, and managing revenues effectively.



- Having an established credit rating will allow the system to access funds if an emergency occurs or an unexpected cost arises. Financial institutions will look at the health of the system, as measured through indicators, ratios, and ratings, previous credit records, and proof of repayment is assured when determining whether the system is a good credit risk. Having access to capital through public or private sources is one element of a financially capable system.

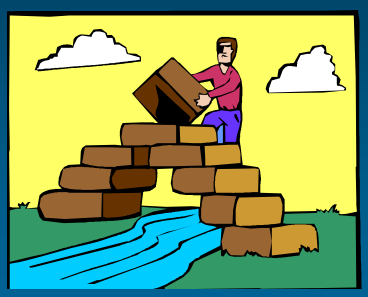
Using Strategic Planning to Develop Capacity

- The focus of strategic planning is on the **future** which can help ensure that the water system can achieve and maintain adequate technical, managerial, and financial capacity.
- The development and implementation of a strategic plan will allow the system the flexibility to react and adapt to changing circumstances. The idea of strategic planning is to 'plan today for an uncertain tomorrow.'
- Strategic planning is:
  - A disciplined effort – "planning today for an uncertain future" – to produce fundamental decisions and actions that will shape and guide an organization's structure, functions, and purpose.
  - A critical and continuous assessment of the what, why, and how of system operations and management.
  - A dynamic and ongoing process of continual reassessment of the strategic plan and adjustments in response to changes in circumstances.



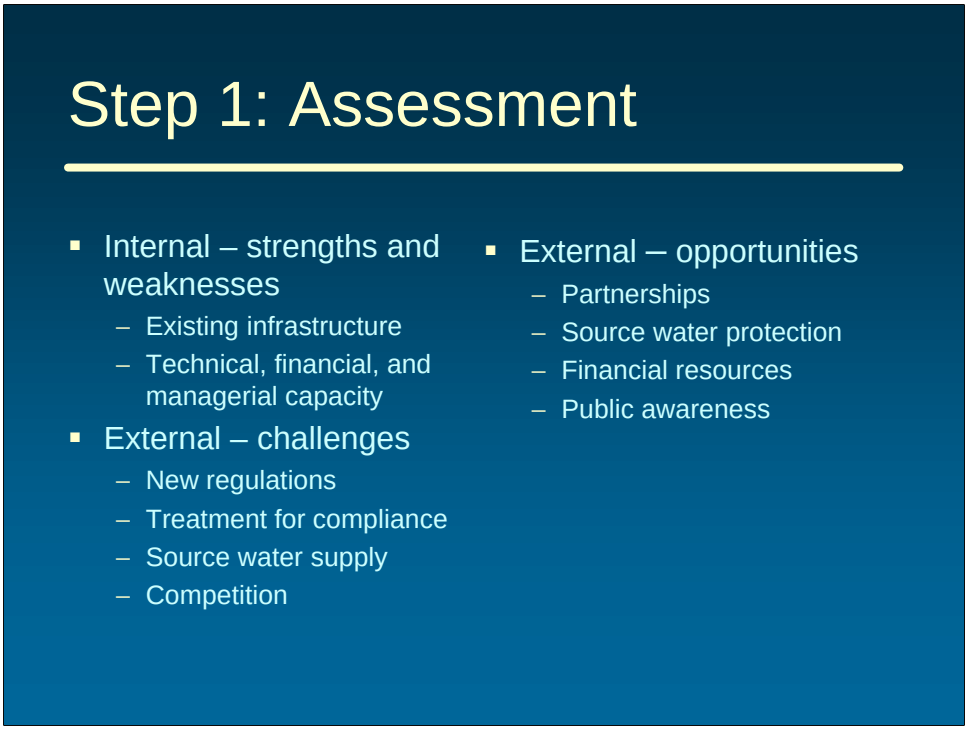
- Each element of capacity is intrinsically related to the others:
  - Technical and managerial capacity depend on financial resources; and
  - Technical and financial capacity depend on managerial support.
- Recognizing the importance of these linkages and ensuring that all the elements of capacity are maintained is essential to the successful long-term operation of a system.
- Because all three components of capacity are interrelated, they depend on planning inputs.

Simplified 5-Step Framework

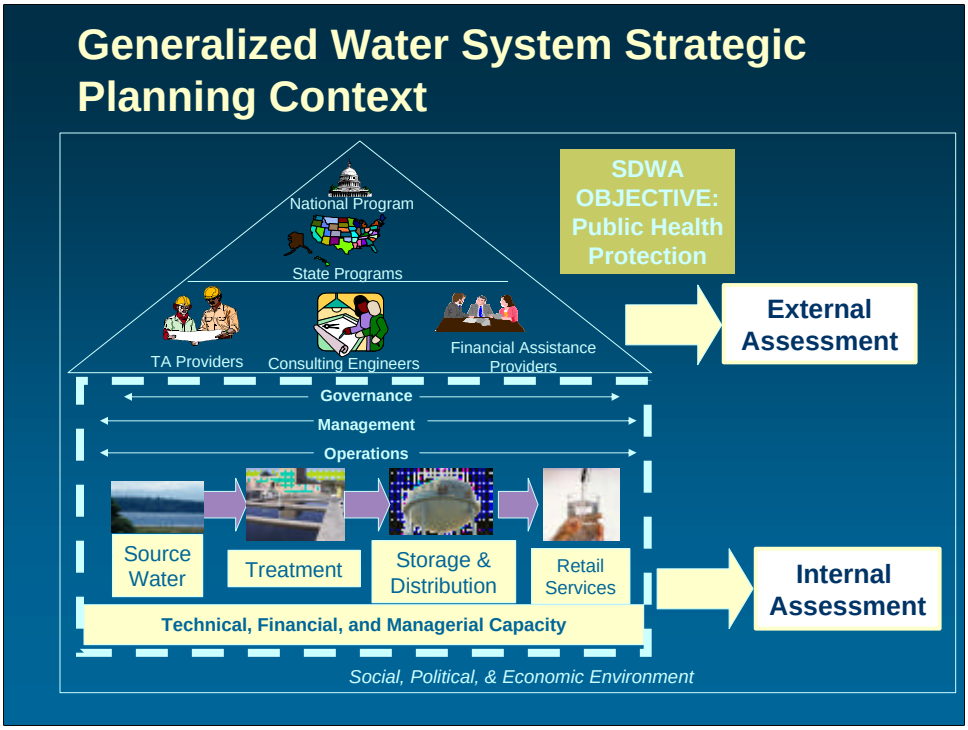


- **Assessing** system capacity, structure, and needs
- **Defining** the "service horizon"
- **Identifying** options for fulfilling the "service horizon"
- **Analyzing** and assessing the options
- **Implementing** and **evaluating** the strategic plan

- Many of the steps required to develop a strategic plan will help a system assess its capacity and identify deficiencies.
- This basic 5-step framework can help even the smallest systems develop strategic plans.



- The first and critical step in water system planning is to develop a baseline understanding of:
  - The current condition of the water system's infrastructure, and the technical, managerial, and financial capacity of the system (i.e., an internal assessment).
  - The challenges facing the water system including compliance with existing and new regulations, treatment for compliance, source water adequacy and supply in relation to expected growth, and competition from other water systems.
  - The opportunities available that can help the system meet the identified challenges.



- The purposes of completing the assessment step of the strategic plan are to ensure that a system is meeting the public health protection objectives of the SDWA and to identify areas of deficiencies. There are three types of deficiencies - each indicating that the system may lack capacity:
  - Internal system deficiencies (i.e., lack of adequate storage or failing distribution system infrastructure). Systems with internal system deficiencies lack technical capacity.
  - Lack of ability to meet external challenges. A system deficient in this area may lack technical (lack of treatment), managerial (untrained water system managers), or financial capacity (non-competitive rates).
  - Lack of knowledge on external opportunities indicates that the owners and managers are unaware of where to get help.

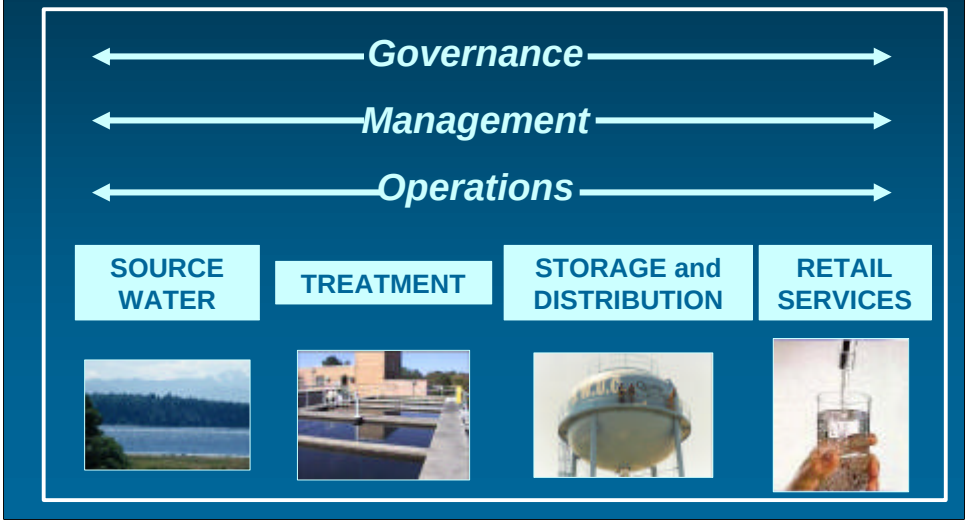
Exercise: Assessment

Worksheet: Assessing Infrastructure and Operations

Function	Area	Infrastructure Assessment
Source Water Development and Protection	Ground / surface water	
	Conveyance	
Drinking Water Treatment	Treatment plant	
	Equipment and operations	
	Systems and controls	
Treated Water Storage and Distribution	Distribution system	
	Storage	
	Pumping	
Retail Customer Services	Services	
	Systems	

- The above worksheet is an example of the type of worksheet systems can use to assess their infrastructure and operations.
- This worksheet requires systems to:
  1. Identify infrastructure components for each function and area of the system.
     - Systems should consider the assets and activities in each functional area. For example, under Source Water Development and Protection--Ground/Surface Water, a ground water system would consider the quality of its source water, its well construction, and the sanitary conditions of the well, to name a few areas.
  2. Enter a brief assessment of the system assets and functions.
     - This should include a description of asset condition, age, and service history. Systems should also make note of the operational tasks associated with these assets. For example, they may want to assess routine operations and maintenance, leak detection and repair, and customer service practices.

Step 2: Defining the Service Horizon

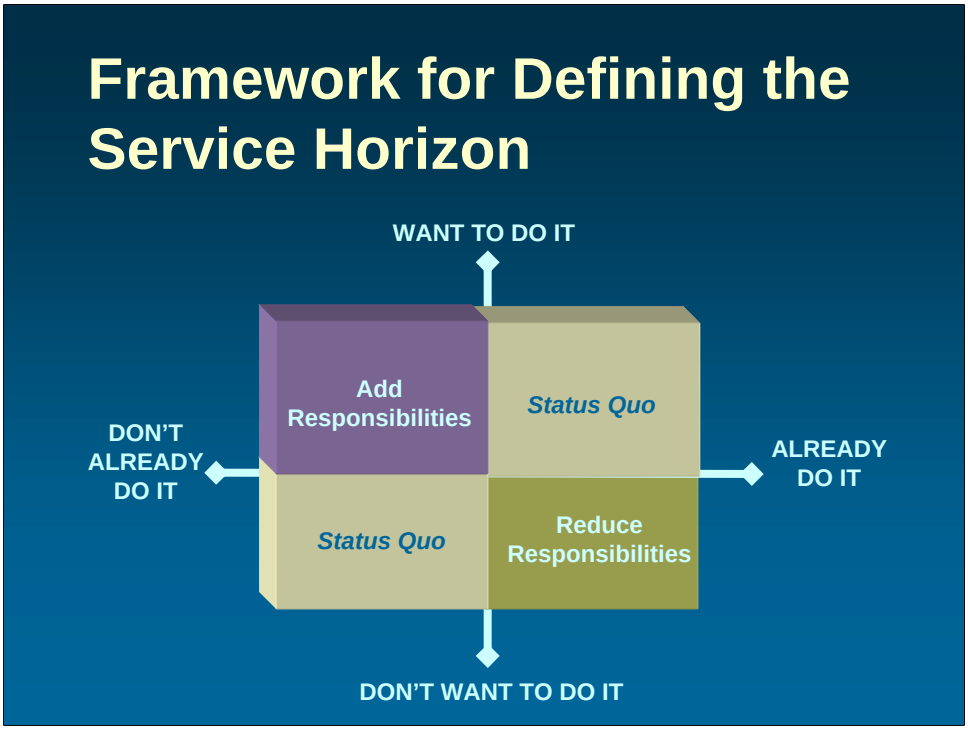


- A water system's service horizon is the combination of its service functions and the roles it provides.
- Water system service functions:
  - Source water development and protection;
  - Drinking water treatment;
  - Treated water storage and distribution; and
  - Retail customer services (e.g., meter reading, billing, collections).
- Water system roles:
  - Governance ensures accountability. Generally, governance is provided by the water system's ultimate owner. A water system's governing body oversees the water system's managers.
  - Management ensures responsibility. Managers must report to the water system's owners (or governing body). Managers also put technical and financial resources in place for operations.
  - Operations ensure performance. Operators are responsible for the technical aspects of system operations and depend on support from system managers. Operations must comply with applicable performance standards.

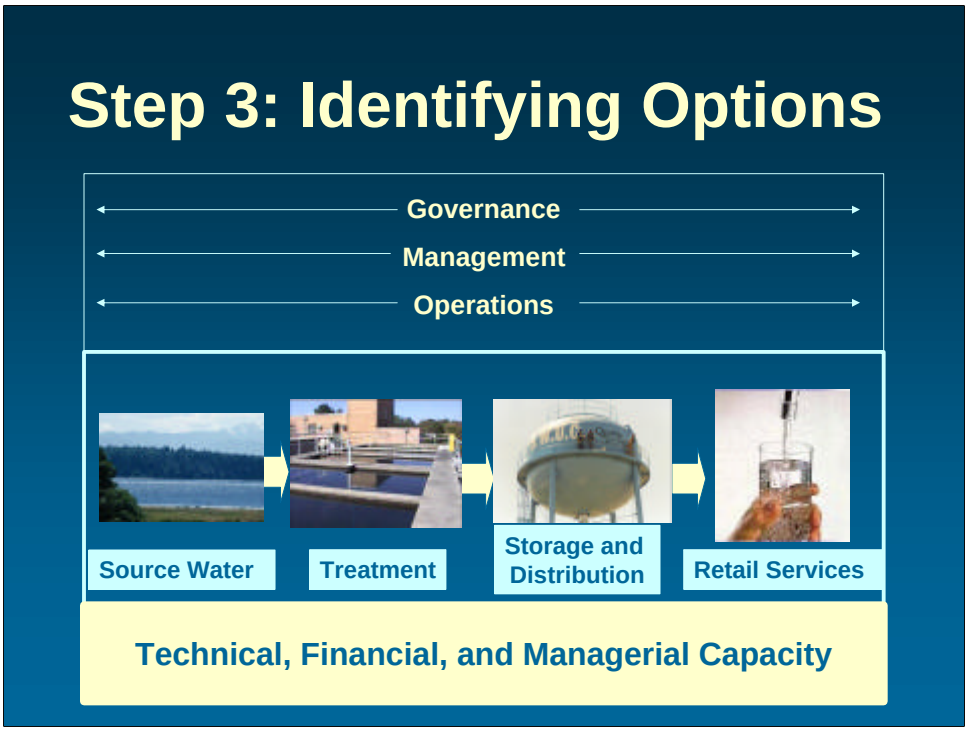
Exercise: Defining the Service Horizon

- What service functions does the system want to provide?
- What roles should the system play in these service functions, given its technical, managerial, and financial capacity?
- How does the system define its service horizon in light of its mission and goals?

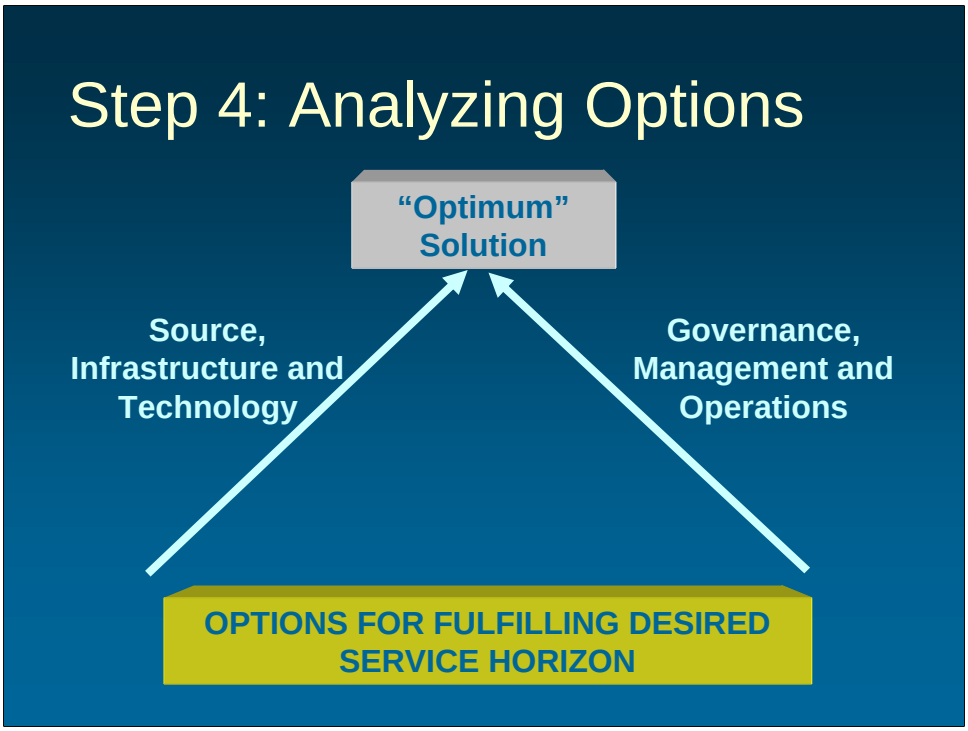
- To answer these questions the system will have to:
  - Decide how service functions are currently being provided;
  - Define the roles the system wants to fill and how it is currently filling those roles; and
  - Have assessed its internal and external capabilities.
- The goal of this step in the strategic plan is to get the system to think about alternative ways to provide each of the service functions or different ways to fulfill the roles and the responsibilities they imply.
- At this point in the strategic planning process, the system will have assessed its deficiencies (i.e., completed a capacity assessment) and have begun to think about solving those problems (i.e., started the process of gaining or improving capacity).



- Water systems have choices with regard to the roles they play. A preference for conducting "business as usual" supports the status quo; other choices support a reduction or expansion of the system's role.
- In defining the service horizon, systems should look at whether or not an action is already being performed by the system (and move to the left or right half of the framework chart above). Systems should then look at the pros and cons of such an action to determine if the action is desired or not (and move to the corresponding upper or lower quadrant). An action's merit determines if it should be added or removed from a system's responsibilities.
    - Example: A system has several leaks in its distribution system. It is not currently taking action to repair the leaks (moves to the left half of the framework chart). The system then determines the pros and cons of repairing the leaks and moves up or down accordingly. A system adds the responsibility of leak repair to its service horizon or maintains the status quo of doing nothing according to its position within the framework.
    - Example: A small city provides wholesale treated water from a neighboring system to its residents and conducts all in-house metering and billing (moves to the right half of the framework chart). The city looks at the pros and cons of maintaining the metering and billing function or contracting it to the neighboring water system. Continuing to perform this operation is maintaining the status quo. If the city determines that contracting the function would save money, it may elect to reduce responsibilities within its service horizon.



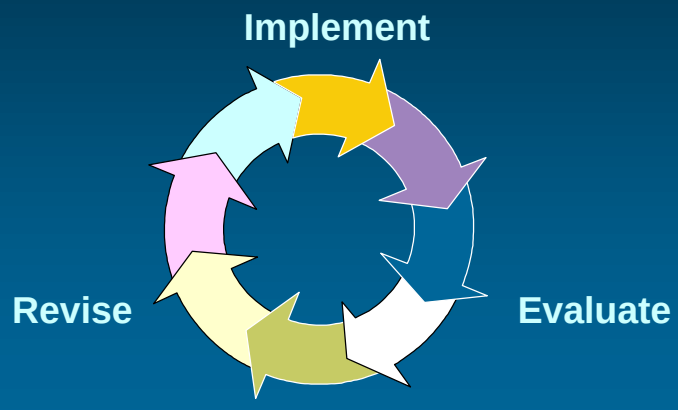
- Step 3 requires a system to identify strategic options that will help achieve compliance with drinking water standards and improve overall performance. Completion of Step 3 will help a system maintain capacity.
- A system should identify options for both system roles (e.g., changing the management structure) and service functions (e.g., upgrading treatment technologies). In other words, the range of strategic options may have a technological dimension and/or an organizational dimension.
- The strategic plan is a great place to begin thinking about alternatives to traditional solutions. The flexibility provided under SDWA may expand the range of alternatives considered worthy of exploration.
- The conventional approach to compliance tends to promote solutions that are relatively confined in time and space (i.e., focusing on one component of one system at a time). However, taking a long-term view (increasing the "temporal" horizon) and looking beyond the immediate boundaries of the water system (increasing the "spatial" horizon), the range of options expands.



- The goal of Step 4 is to fully consider all technological options and all structural options in such a way as to identify the optimum solution—the solution that achieves cost-effectiveness and other goals that are defined by the system.
- Systems must evaluate options based on a defined set of criteria that is developed based on the characteristics and goals of the system. Since each water system is unique, one evaluation criterion or set of criteria will not fit all.
- Analysis of options should include the examination of the impacts on the:
  - **Economics of the system**. Is the option cost effective? How will implementation of the option affect the total cost of service? Are public or private funding resources available to support implementation of the option? Is the option responsive to changing market conditions?
  - **Performance of the system**. How will the option affect operational performance and efficiency and the quality of water service? Does the option promote capacity development and continuous improvement?
  - **Regulatory issues for the system**. Will the option promote compliance? Is approval by State regulators likely?
  - **Implementation issues**. Is implementation feasible? Can the option be implemented within a reasonable time frame for achieving goals? Will customers and key stakeholders accept and support the option?
- Options also should be evaluated relative to how well they serve the mission and goals of the water system.

- One of the ongoing challenges for systems is to regularly re-evaluate the technical, managerial, and financial aspects of the system to ensure that the chosen solution is helping the system meet its goals.
- Since each system is unique and faces a unique set of challenges, the "optimum solution" is different for each system.
- An optimum solution is one that achieves the system's goals at the lowest possible cost.
- If a sub-optimum solution is chosen—one that is less cost-effective than feasible alternatives—planners should provide an explicit explanation for the choice in terms of other relevant evaluation criteria.

Step 5: Implementing and Evaluating the Strategic Plan



- Implementing the chosen option may present another set of challenges for water systems. Most planning options will require a commitment of organizational resources.
- A system should consider whether:
  - It has the technical, financial, and managerial resources to implement the option.
  - The leadership of the organization is prepared for, and committed to, the implementation process.
  - Special training will be needed.
  - It will have to make organizational or personnel changes and how any internal organizational conflicts will be managed.
  - A certification, permit, or economic regulatory approval is required for implementation of the option.
  - Implementation will raise any special legal or liability issues.
  - Other stakeholders will be informed and involved in implementation.
  - Additional funding will be necessary and available for implementation.
- Ongoing monitoring and evaluation can help water systems assess whether the strategic plan is achieving specified goals.

Exercise: Implementing Your Plan

Worksheet: Implementation Action Plan and Challenges

Required Action	Proposed Start Date	Proposed End Date	Related Challenges	Plans to Address Challenges

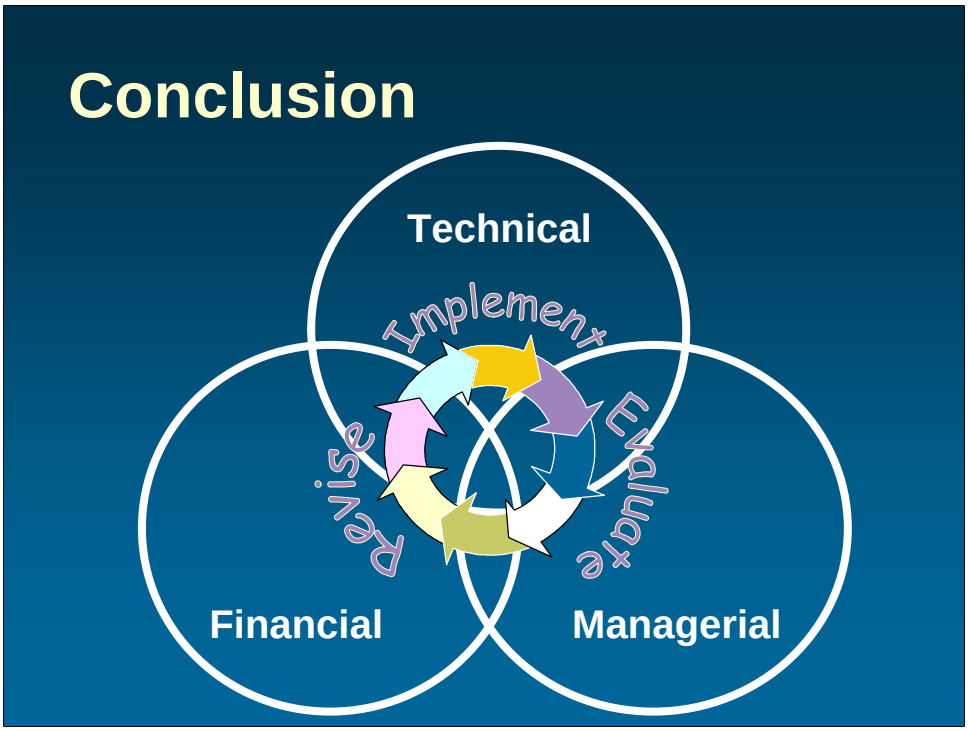
- The above worksheet is an example of the type of worksheet systems can use to help implement the strategic plan.
- **Step #1: Required action**
  - Describe the steps that are required for implementation of the plan. These might include key meetings, financing approvals, or any construction projects, for example. If there are multiple stages to the plan, a system may want to group these actions accordingly.
- **Step #2: Proposed start date**
  - Enter the date on which the system hopes to start the required action. If there is no specific date set the system can enter a month or day by which the system would like to have this part of the plan set in motion.
- **Step #3: Proposed end date**
  - Enter the date by which this required action will be finished, or the date by which the system would like to have the action finished.
- **Step #4: Related challenges**
  - Summarize any potential problems related to each required action and think about these before the project begins. Changes or updates should be made as the project progresses.
- **Step #5: Plans to address challenges**
  - Enter any ideas for overcoming potential problems or any problems that have been encountered. As the strategic plan is implemented, and new or different challenges arise, this plan can be edited or amended to address the changes.

Strategic Planning: Recap

- A strategic plan will help a system to:
  - Address both expected and unexpected problems
  - Achieve and maintain adequate technical, managerial, and financial capacity
  - React and adapt to changing circumstances
  - Meet public health protection goals

5-Step Strategic Planning Process

- ***Assess***
- ***Define***
- ***Identify***
- ***Analyze***
- ***Implement and evaluate***



- **Capacity development** is the ability to plan for, achieve, and maintain compliance with applicable drinking water standards.
- Capacity consists of the **technical, managerial, and financial** abilities to provide safe and affordable water to customers**.** All three components of capacity are necessary for a system to achieve and maintain compliance.
- **Strategic planning** can help systems develop and maintain technical, managerial, and financial capacity. Strategic planning is an ongoing process.
    - Once the plan is developed, a system must work to implement, evaluate, and revise the plan in order to maintain capacity.