



Asset Management for Small Water Systems

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Asset management is creating a plan to maintain or replace system assets (such as pumps, pipes, etc.) at the most optimal time and cost to maintain the accepted level of service for your system. Water systems that take care of their assets are more likely to ensure safe and reliable drinking water for their customers. The lowest life cycle cost is the most appropriate cost for rehabilitating, repairing, or replacing an asset. Implement asset management through an asset management program, which typically includes a written asset management plan.

Challenges Faced by Water Systems

- ◆ Determining the best (or optimal) time to rehabilitate/repair/replace aging assets.
- ◆ Increasing demand for services.
- ◆ Overcoming resistance to rate increases.
- ◆ Diminishing resources.
- ◆ Rising service expectations of customers.
- ◆ Increasingly stringent regulatory requirements.
- ◆ Responding to emergencies due to asset failures.
- ◆ Protecting assets.

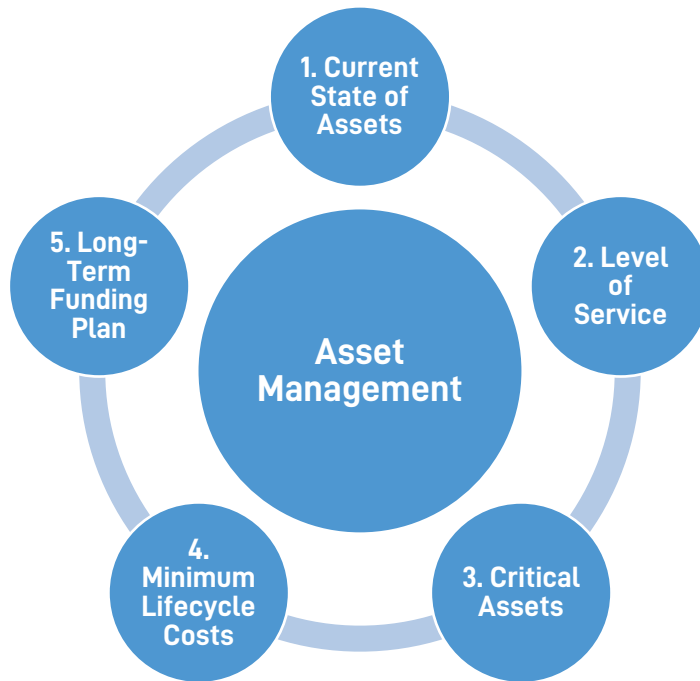
Benefits of Asset Management

- ◆ Prolonging asset life and aiding in rehabilitation/repair/replacement decisions through efficient and focused operations and maintenance.
- ◆ Meeting consumer demands with a focus on system sustainability.
- ◆ Setting rates based on sound operational and financial planning.
- ◆ Budgeting focused on activities critical to sustained performance.
- ◆ Meeting service expectations and regulatory requirements.
- ◆ Improving response to emergencies.
- ◆ Improving security and safety of assets.

Implementing Asset Management—Five Core Questions Framework

A good starting point for any size water system is to ask five core questions about your assets. These questions create a framework that walks you through all major activities associated with asset management. You can implement this framework at the level of detail reasonable for your system.

These five core questions provide the foundation for many asset management best practices. Several asset management best practices are listed below for each core question. Keep in mind that best practices are constantly being improved and updated.



The Five Core Questions of Asset Management

1. What is the current state of my system's assets?

The first step in managing your assets is knowing their current state. Because some of this information may be difficult to find, use estimates when necessary. Over time, as assets are rehabilitated, repaired, or replaced, your inventory will become more accurate.

You should ask:

- ◆ What do I own?
- ◆ Where is it?
- ◆ What is its condition?
- ◆ What is its useful life?
- ◆ What is its value?

Best practices include:

- ◆ Prepare an asset inventory and system map.
- ◆ Develop a condition assessment and rating system that has numerical value.
- ◆ Assess remaining useful life by consulting projected useful-life tables or decay curves.
- ◆ Determine asset values and replacement costs.

2. What is my required "sustainable" level of service?

Knowing your required sustainable level of service will help you implement an asset management program and communicate to your customers what you are doing. Quality, quantity, reliability, and environmental standards are elements that can define level of service and associated system performance goals, both short- and long-term. Use information about customer demand, data from utility commissions or boards, and information from other similar

water systems to develop your level of service requirements. Update your level of service requirements to account for changes due to growth, regulatory requirements, and technology improvements.

You should ask:

- ◆ What level of service do my customers demand?
- ◆ What do the regulators require?
- ◆ What is my actual performance?
- ◆ What are the physical capabilities of my assets?

Best practices include:

- ◆ Analyzing current and anticipated customer demand and satisfaction with the system.
- ◆ Understanding current and anticipated regulatory requirements.
- ◆ Writing and communicating to the public a level of service "agreement" that describes your system's performance targets.
- ◆ Formally adopting a level of service for your system.
- ◆ Using level of service standards to track system performance over time.

3. Which assets are critical to sustained performance?

Because assets fail, how you manage the consequences of failure is vital. Not every asset presents the same failure risk or is equally critical to your water system's operations. Therefore, it is important to know which assets are required to sustain your water system's performance. Critical assets are those you decide have a high risk of failing (such as age or poor condition) and major consequences if they do fail (like major expense, system failure, or safety concerns). Decide how critical each asset is and rank them accordingly. Many water systems may have already accomplished this type of analysis in vulnerability assessments.

You should ask:

- ◆ How can assets fail?
- ◆ How do assets fail?
- ◆ What are the likelihoods (probabilities) and consequences of asset failure?
- ◆ What does it cost to repair the asset?
- ◆ What are the other costs (such as social or environmental) associated with asset failure?

Best practices include:

- ◆ Developing a criticality assessment and ranking system that has a numerical value according to how critical each asset is to system operations.
- ◆ Determining the probability of failure and listing assets by failure type.
- ◆ Analyzing failure risk and consequences.
- ◆ Reviewing and updating your system's vulnerability assessment (if your system has one).

4. What are my minimum life cycle costs?

Operations and maintenance (O&M), personnel, and the capital budget account for an estimated 85 percent of typical water system expenses. Asset management enables a system to

determine lowest cost options for providing the highest level of service over time. You want to optimize the work O&M crews are doing, where they are doing it, and why. An asset management program helps make risk-based decisions by choosing the right project, at the right time, for the right reason.

You should ask:

- ◆ What alternative strategies exist for managing O&M, personnel, and capital budget accounts?
- ◆ What strategies are most feasible for my organization?
- ◆ What are the costs of rehabilitation, repair, and replacement for critical assets?

Best practices include:

- ◆ Moving from reactive maintenance to predictive maintenance.
- ◆ Knowing the costs and benefits of rehabilitation versus replacement.
- ◆ Looking at lifecycle costs, especially for critical assets.
- ◆ Deploying resources based on asset conditions.

5. What is my best long-term funding strategy?

Sound financial decisions and developing an effective long-term funding strategy are critical to implementation of an asset management program. Knowing both the full economic costs of operating and maintaining your system, and the revenues generated by your water system enable you to determine your system's financial forecast. Your system's financial forecast then helps you decide what changes need to be made to your system's long-term funding strategy.

You should ask:

- ◆ Do we have enough revenue to maintain our assets for our required level of service?
- ◆ Is our rate structure sustainable for our system's long-term needs?
- ◆ What external funding sources are realistically available?

Some strategies to consider:

- ◆ Revising rate structure.
- ◆ Funding a dedicated reserve from current revenues (such as creating an asset annuity).
- ◆ Financing asset rehabilitation, repair, and replacement through borrowing or other external financial assistance.
- ◆ DWSRF construction loan applicants receive bonus points on their application for attending an asset management training, having an asset inventory, and assigning criticality numbers to assets.
- ◆ Starting in 2019, the Drinking Water State Revolving Fund (DWSRF) construction loan recipients will be required (as part of the funding agreement scope of work) to implement an asset management program if the applicant currently does not have an asset management program for their water system. Funding will be provided as part of the loan package to cover costs associated with developing an asset management program.
- ◆ The RCAC spreadsheet is available on the DWSRF webpage for water systems interested in starting an asset inventory. [Asset Inventory Worksheet \(Excel\)](#).

- ◆ Technical assistance may be available to assist with development of an asset inventory.

Implementing Asset Management—Follow-Up and Continuing Steps

The asset management five core questions is the starting point for asset management setting the framework of good asset management planning. Beyond planning, implement your asset management to achieve continual improvements through a series of "plan, do, check, act" steps.

Plan	Five core questions framework (short-term), revise asset management plan (long-term).
Do	Implement asset management program.
Check	Evaluate progress, changing factors, and new best practices.
Act	Take action based on review results.

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