



# Asset Management: A Handbook for Small Water Systems

One of the Simple Tools for Effective  
Performance (STEP) Guide Series



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# Is This Guide for Me?

This guide is designed for owners and operators of small community water systems (CWSs). CWSs include all systems (both publicly and privately owned) with at least 25 year-round residential customers or 15 year-round service connections. Typical systems that may find this guide useful include:

- Small towns
- Rural water districts
- Tribal systems

This guide presents basic concepts of asset management and provides the tools to develop an asset management plan. Very small CWSs may have some difficulty in completing some of the worksheets included in this booklet, while medium CWSs may find the worksheets too simple for their needs. Due to each system's particular circumstances, the time and effort needed to develop the plan will vary. Building a team, made up of your operator, board members, owners, assistance providers, and state drinking water staff, will help you develop an effective and complete plan.

State and Regional Tribal Capacity Development Program Coordinators are available to help you understand the concepts covered in this guide and complete the accompanying worksheets. They can also provide additional asset management tools and offer resources to help implement an asset management plan. Contact your Capacity Development Program for more information. Contact information is provided in Appendices E and F.

You may download this guide from EPA's Safe Drinking Water Website at <https://www.epa.gov/dwcapacity/simple-tools-effective-performance-step-guide-series>.

EPA has developed a simpler asset management booklet for homeowners' associations and manufactured home communities called "Taking Stock of Your Water System" (EPA 816-K-03-002). You can obtain this booklet by downloading it from EPA's Safe Drinking Water Website at <https://www.epa.gov/dwcapacity/simple-tools-effective-performance-step-guide-series>.

# What Will I Learn?

As a drinking water system owner or operator, your most important job is delivering safe and secure drinking water to your customers. Part of providing safe and secure drinking water is taking care of your system's facilities and equipment and planning for any needed rehabilitations and replacements. An asset management plan will help you meet these goals in an efficient and cost-effective manner.

This guide will help you by providing information about:

- How asset management can help improve your system's financial health and ability to provide safe drinking water.
- How asset management fits into the development of an overall plan for your system's future (i.e., strategic planning).
- How to complete a five-step asset management process including:
  - ▶ **Conducting** a thorough asset inventory.
  - ▶ **Prioritizing** the rehabilitation and replacement of your assets.
  - ▶ **Developing** an annual estimate of needed reserves and an annual budget.
  - ▶ **Implementing** the asset management plan.
  - ▶ **Reviewing and revising** the asset management plan.



A water tower that has exceeded its useful life!

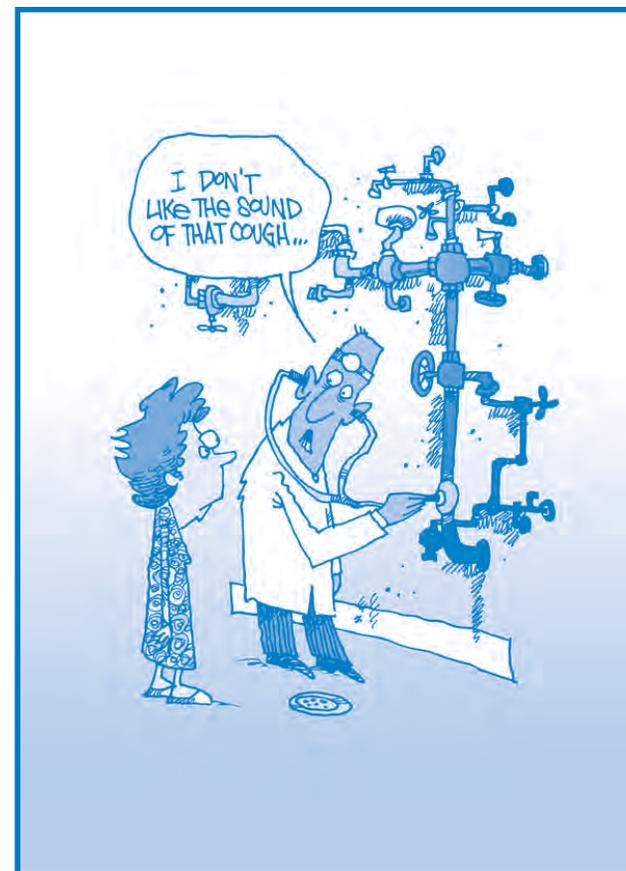
The worksheets and other information in this guide will also help you begin to develop an overall strategy for your system. Using this guide along with EPA's "Strategic Planning: A Handbook for Small Water Systems" (<https://www.epa.gov/dwcapacity/simple-tools-effective-performance-step-guide-series>) will help you develop, implement, and receive optimal benefit from an asset management plan that fits in with your system's overall strategy.

# How Can Asset Management Help Me?

Applying the practices recommended in this guidebook will help you improve the management of your system by:

- Increasing your knowledge of your system, which will allow you to make better financial decisions. This is useful information when considering options to address various system challenges such as meeting regulatory requirements or upgrading system security.
- Reducing system “down-time” and the number of emergency repairs, since you will have planned for the replacement and rehabilitation of your assets.
- Prioritizing rehabilitation and replacement needs and providing time to research cost-effective alternatives.
- Showing investors and the public that you are using their money effectively and efficiently, which may make them more likely to increase investment or tolerate rate increases.
- Giving you greater access to financial assistance. Some funding sources give applicants extra credit (higher priority ratings) for having an asset management plan or a capital improvement plan.

For additional information on funding sources, see Appendix B. Your State or Regional Capacity Development Program can also provide assistance to help you develop and implement an asset management plan, and those contacts can be found here: <https://www.epa.gov/dwcapacity/find-epa-capacity-development-contact>.



# What Is Asset Management?

**Asset management** is a planning process that ensures that you get the most value from each of your assets<sup>1</sup> and have the financial resources to rehabilitate and replace them when necessary. Asset management also includes developing a plan to reduce costs while increasing the efficiency and the reliability of your assets. Successful asset management depends on knowing about your system's assets and regularly communicating with management and customers about your system's future needs.

You should thoroughly review your asset management plan at least once a year, noting any relevant changes. Throughout the year, you should keep a running list of items to consider or include in the annual update.



## What Is the Governmental Accounting Standards Board's Statement #34?

The Governmental Accounting Standards Board's Statement #34 (GASB 34) revises several accounting and financial reporting practices for state and local governmental entities including publicly-owned water systems. If your water system is publicly owned, you will need to follow GASB 34 requirements to obtain a "clean opinion" (i.e., a good credit rating) from an auditor. Without a clean opinion, you may face higher interest rates on loans and bonds and may be more closely scrutinized by regulators and public officials. Following GASB 34 standards will require publicly-owned water systems to report the value of infrastructure assets and the cost of deferred maintenance. An accurate and up-to-date asset management plan will help you comply with this requirement. See Appendix C for more information on GASB 34.

**Note:** If you operate a privately owned water system, you do not need to comply with GASB 34. However, complying with generally accepted accounting principles (GAAP) makes sense for any system. Visit the Financial Accounting Standards Board (FASB) at [www.fasb.org](http://www.fasb.org) for more information on GAAP for private entities.

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<sup>1</sup> In this guide, an "asset" is any building, tool, piece of equipment, furniture, pipe, or machinery used in the operation of your system.

# How Does Asset Management Relate to Strategic Planning?

The U.S. drinking water industry faces many key challenges in the 21st century, such as replacing aging infrastructure, addressing security concerns, and complying with new regulations. Depending on the circumstances of your system, you may need to make changes to the operation of your system.

**Strategic planning** is a management concept that helps you address and prepare for both anticipated and unexpected problems. Strategic planning utilizes asset management to evaluate your system's current physical situation, and it also evaluates your system's financial and managerial situation. It requires you to make fundamental decisions about your water system's purpose, structure, and functions.

In order to make Strategic Planning work for your water system, you need to collect the information that will allow you to make intelligent, informed decisions about your system's future. Developing an asset management plan can provide you with some of that information. For more information on Strategic Planning, see *Strategic Planning: A Handbook for Small Water Systems* at <https://www.epa.gov/dwcapacity/simple-tools-effective-performance-step-guide-series>, or contact your State or Regional Tribal Capacity Development Program Coordinator.



# What Is the Asset Management Process?

Asset management consists of the following five steps:

- 1. Taking an inventory.** Before you can manage your assets, you need to know what assets you have and what condition they are in. This information will help you schedule rehabilitations and replacements of your assets.
- 2. Prioritizing your assets.** Your water system probably has a limited budget. Prioritizing your assets will ensure that you allocate funds to the rehabilitation or replacement of your most important assets.
- 3. Developing an asset management plan.** Planning for the rehabilitation and replacement of your assets includes estimating how much money you will need each year to maintain the operation of your system each year. This includes developing a budget and calculating your required reserves.
- 4. Implementing your asset management plan.** Once you have determined how much money you will have to set aside each year and how much additional funding (if any) you will need to match that amount, you need to work with your management and customers and with regulators to carry out your plan and ensure that you have the technical and financial means to deliver safe water to your customers.
- 5. Reviewing and revising your asset management plan.** Once you have developed an asset management plan, do not stick it in a drawer and forget about it! Your asset management plan should be used to help you shape your operations. It is a flexible document that should evolve as you gain more information and as priorities shift.



This guidebook provides information and worksheets that will help you complete all five steps. As you work your way through this guidebook, you should remember that the suggestions provided and the results you develop based on the worksheets are not set in stone. You should adjust your plan based on your own experience and the particular characteristics of your system. In addition, you should reevaluate your plan every year, updating each of the worksheets provided in this booklet.

Contact your State or Regional Tribal Capacity Development Program Coordinator for more information or assistance. Other sources of information on asset management are listed in Appendix D of this guide.

# Step #1 – How Do I Inventory My Assets?

Before you can manage your assets, you need to know what you have, what condition it is in, and how much longer you expect it to last. To complete an inventory, list all your assets and collect the following information for each:

1. **Condition**
2. **Age**
3. **Service history**
4. **Useful life**

The worksheets on the following pages will help you develop an asset inventory and keep track of important information. Detailed instructions are provided.

You may want to keep track of your assets on a computer spreadsheet or use custom software. Appendix D includes information on other asset management resources.

Inventorying your assets can be an intensive job. Get the best information that you can, but don't get bogged down in this step and use estimates where needed. If you keep up with an asset management program, new information will become available as assets get replaced or rehabilitated, and your inventory of assets will improve.



## Remember!

The worksheets in this guide could contain sensitive information about your water system. Make sure you store these worksheets, as well as all other asset information about your system, in a secure location.

# Introduction to the System Inventory Worksheet

The following System Inventory Worksheet will help you:

- Identify all of your system's assets;
- Record the condition of your assets;
- Record the service history of your assets;
- Determine your assets' adjusted useful lives;
- Record your assets' ages; and,
- Estimate the remaining useful life of each of your assets. Usually, there are two steps to estimating useful life:
  1. Determine the expected useful life by using the manufacturer's recommendations or the estimates provided in the box to the right. Adjust these numbers based on the specific conditions and experiences of your system.
  2. Calculate an adjusted useful life by taking into account the service history and current condition of your asset.

Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

## Estimated Useful Lives

Asset	Expected Useful Life (in years)
Intake Structures	35-45
Wells and Springs	25-35
Galleries and Tunnels	30-40
Chlorination Equipment	10-15
Other Treatment Equipment	10-15
Storage Tanks	30-60
Pumps	10-15
Buildings	30-60
Electrical Systems	7-10
Transmission Mains	35-40
Distribution Pipes	35-40
Valves	35-40
Blow-off Valves	35-40
Backflow Prevention	35-40
Meters	10-15
Service Lines	30-50
Hydrants	40-60
Lab/Monitoring Equipment	5-7
Tools and Shop Equipment	10-15
Landscaping/Grading	40-60
Office Furniture/Supplies	10
Computers	5
Transportation Equipment	10

Note: These numbers are ranges of expected useful lives drawn from a variety of sources. The ranges assume that assets have been properly maintained.



# Using the System Inventory Worksheet

This section presents instructions for completing the System Inventory Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 10.

## Step #1

### Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets change, or start a new worksheet each year.

## Step #2

### Identify your assets.

- Write in each of your system's assets. Be as specific as possible by providing location, manufacturer, or some other identifier for each asset. List separately assets made of different materials or installed at different times. For example, you might list a section of your distribution system as "10-inch PVC on Main St." You can make a copy of this worksheet if you need more room to list assets.

## Step #3

### Fill in expected useful life.

- Use the manufacturer's recommendation or the list provided in the box on page 9 to enter the expected useful life for each asset.

## Step #4

### Describe assets' condition.

- Briefly describe the condition of each asset. Focus especially on conditions that may influence the useful life (for example, rust or broken parts).

## Step #5

### Describe service history.

- Briefly describe the service history of each asset. Include routine maintenance activities as well as any repairs and rehabilitations. List how often you have made repairs and rehabilitations.

## Step #6

### Estimate the adjusted useful life for each asset.

- Using the Expected Useful Life (step 3) as a guide, estimate the adjusted useful life for each of your assets by considering its current condition (step 4) and its service history (step 5).
- If your asset is in poor condition, has not been properly maintained, or faces other challenges (poor water or soil quality, excessive use, etc.), then the adjusted useful life is likely to be less than the lower end of the expected useful life range.
- If your asset is in good condition, has been properly maintained, and faces average water quality, then you can use the average useful life value. However, you may want to use the lower end of the range to be more conservative and help ensure that you are prepared to replace the asset.

## Step #7

### Record age.

- For each asset, fill in how long the asset has been in use. If the asset has been previously used by another system, you should list the total age, not just the length of time your system has used it.

## Step #8

### Calculate the remaining useful life.

- For each asset, calculate the remaining useful life by subtracting its age (step 7) from its adjusted useful life (step 6).

**Example System Inventory Worksheet**

Date Worksheet Completed/Updated: 8/14/02

Asset	Expected Useful Life	Condition	Service History	Adjusted Useful Life	Age	Remaining Useful Life
Well 1 (1993)	30	Good		30	9	21
Well 1 pump	10	Good	Rehab (1996)	10	9	1
Well 2 (1993)	30	Good		30	9	21
Well 2 pump	10	Good	Rehab (1998)	10	9	1
Pumphouse (1993)	30	Good		30	9	21
Electrical components	10	Some corrosion	Rehab (1994)	10	9	1
Chlorinator (1993)	10	Good	Rehab (1998)	5	3	2
Storage tank 1 (1993)	40	Good	Rehab (2000) - \$17,000	40	9	31
Storage tank 2 (1993)	40	Good	Rehab (2000) - \$17,000	40	9	31
Storage tank 3 (2000)	40	Almost new		40	2	38
<i>Distribution System:</i>						
Hydrants (15)	40	Unknown		40	9	11
Valves (45)	40	Unknown	6 valves don't work	40	9	11
6-inch (PVC)	60	Unknown		60	9	51
4-inch (PVC)	60	Unknown		60	9	51
2-inch (PVC)	60	Unknown	Repair breaks (2/year)	60	9	51

# Explanation of Example System Inventory Worksheet

A small, municipally-owned water system serving 750 service connections has decided to develop an asset management plan. A neighboring water system recently negotiated very good interest rates on a loan to fund distribution pipe replacement due in part to their asset management plan. This inspired the managers of this system to develop their own asset management plan.

In addition, the municipality plans to begin significant road work sometime in the next five years. The water system managers have been asked to determine whether any of the pipes under the roads scheduled to be repaired will need to be replaced in that time frame.

As a first step, the system operator develops a list of the system's assets and evaluates the condition of each asset. To differentiate the assets, the operator includes the year that some of the assets were installed. Although he does not have comprehensive information about every asset on the list, there is enough information to begin assessing the overall health of the system.

Note that although the estimated useful life for a chlorinator is 10 years (see the box on page 9), the operator of this system knows that they had to replace their previous chlorinator after only 5 years. He adjusts the useful life for the chlorinator from the estimated 10 years to a more conservative 5 years. He uses the manufacturers' recommendations as the useful life for the hydrants, valves, and PVC pipes.

Upon completing the System Inventory Worksheet, the system managers notice that they will have to replace a significant number of their assets starting next year and then about every ten years (11, 21, and 31 years from now). They begin to consider whether spacing the projects out over two or three years is possible, or if they will need to replace these assets in the same year.

In addition to the System Inventory Worksheet, the other worksheets in this guide will help the system managers prioritize the assets and determine how much money they will need to set aside each year to meet the financial demands of replacing them when necessary.

## Step #2 – How Do I Prioritize My Assets?

Once you have inventoried your assets, your next step will be to prioritize your assets based on their importance to your system. Prioritization means ranking your system's assets to help you decide how to allocate resources. Factors involved in prioritization include:

- How soon will you have to replace an asset (its remaining useful life).
- How important the asset is to the provision of safe drinking water (its impact on public health).
- How important the asset is to the operation of the system (can other assets do the same job?).

A water system is often one of many responsibilities of a community or municipality. Other factors can influence which water system projects are funded and when they are completed. For example, in many small communities, distribution system rehabilitation and replacement is tied to the road repair schedule and budgeting. Developing an asset management plan and prioritizing your assets will help you determine when you should replace your assets so as to not jeopardize water delivery, but you may have to work with your community or municipality to develop a replacement schedule that works for all parties.

Ideally, an asset management plan will help you forecast your financial needs well into the future and develop a rehabilitation and replacement schedule appropriate for your system's priorities.

### An Example Prioritization Scheme

There is no one correct way to prioritize your assets. Most often, assets are prioritized based on their remaining useful life. However, this is not the only way to prioritize your assets and may not be the best way for your system.

One possible prioritization scheme, in order from most critical assets to the least critical:

1. Existing threat to public health, safety, or environment;
2. Potential public health, safety, or environmental concern;
3. Internal safety concern or public nuisance;
4. Improved system operations & maintenance (O&M) efficiency; and
5. It would be nice to have...

# Introduction to the Prioritization Worksheet

The following Prioritization Worksheet will help you:

- Consider the redundancy and importance of each of your system's assets; and,
- Prioritize your assets based on their remaining useful life, redundancy, and importance.

Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

## Things to Keep In Mind

- Assets with a shorter **remaining useful life** should have a higher priority, as you will have to replace these assets sooner.
- Assets that are more **important** to your ability to deliver safe water should have a higher priority, because your water system relies on these assets to deliver safe water.
- Assets for which there is less **redundancy** should have a higher priority, because your system will have trouble continuing to operate without them.
- The “big picture,” or how your community is planning development, is important to your operating plans and your prioritization decisions. For example, if the replacement of distribution system pipes is tied to road repairs, and the road repairs are delayed, water system improvements will also be delayed.
- Any engineering master plans, capital improvement plans (CIPs), or comprehensive performance evaluations (CPEs) done for your system.

Prioritization Worksheet

Date Worksheet Completed/Updated: **1**

<b>2</b> Asset	<b>3</b> Remaining Useful Life	<b>4</b> Importance	<b>5</b> Redundancy	<b>6</b> Priority (1 is high)

# Using the Prioritization Worksheet

This section presents instructions for completing the Prioritization Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 16.

## Step #1

### Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet at least every year. You can either make minor adjustments to the worksheet as your priorities change or problems are addressed, or start a new worksheet each year.

## Step #2

### List your assets.

- Copy your list of assets from step 2 of the System Inventory Worksheet.

## Step #3

### Enter assets' remaining useful life.

- For each of your assets, copy the remaining useful life from step 8 of the System Inventory Worksheet.

## Step #4

### Describe assets' importance.

- Briefly describe the importance of each of the assets to the operation of your system and the protection of public health. Assets that are required in order to keep the system running are usually more important than those that just make operation more efficient.

## Step #5

### Describe assets' redundancy.

- Briefly describe the redundancy of each of the assets. Are there assets that can do the same job, even if they cannot do it as well?

## Step #6

### Evaluate assets' priority.

- Considering remaining useful life, importance, redundancy, and any other important factors, rank your assets in terms of how important it is to reserve money for them. Write "1" next to the asset with the highest priority, "2" next to the asset with the next highest priority, and so on. You may find that you have more than one asset with the same level of priority. You can assign the same ranking to all assets with the same priority.
- Assets with a shorter **remaining useful life** should have a higher priority (lower number) because you will need to rehabilitate or replace them relatively soon.
- Assets that are more **important** to your ability to deliver safe water should have a high priority (lower number), because of public health protection goals.
- Assets for which there is less **redundancy** should have a high priority (lower number), because your system will have trouble continuing to operate without them.

**EXAMPLE** Prioritization Worksheet

Date Worksheet Completed/Updated: 8/14/02

Asset	Remaining Useful Life	Importance	Redundancy	Priority (1 is high)
<i>Well 1 (1993)</i>	<i>21</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>6</i>
<i>Well 1 pump</i>	<i>1</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>3</i>
<i>Well 2 (1993)</i>	<i>21</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>6</i>
<i>Well 2 pump</i>	<i>1</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>3</i>
<i>Pumphouse (1993)</i>	<i>21</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>6</i>
<i>Electrical components</i>	<i>1</i>	<i>Needed for control</i>	<i>No redundancy - corrosion</i>	<i>2</i>
<i>Chlorinator (1993)</i>	<i>2</i>	<i>Mandatory</i>	<i>No redundancy - need backup</i>	<i>1</i>
<i>Storage tank 1 (1993)</i>	<i>31</i>	<i>Need for fire flow and demand</i>	<i>Other tanks</i>	<i>6</i>
<i>Storage tank 2 (1993)</i>	<i>31</i>	<i>Need for fire flow and demand</i>	<i>Other tanks</i>	<i>6</i>
<i>Storage tank 3 (2000)</i>	<i>38</i>	<i>Need for fire flow and demand</i>	<i>Other tanks</i>	<i>6</i>
<i>Distribution System:</i>				
<i>Hydrants (15)</i>	<i>11</i>	<i>Needed for public safety</i>	<i>Other hydrants</i>	<i>5</i>
<i>Valves (45)</i>	<i>11</i>	<i>Needed for isolation</i>	<i>Other valves, but some are out of service</i>	<i>4</i>
<i>6-inch (PVC)</i>	<i>51</i>	<i>Needed for delivery</i>	<i>No redundancy</i>	<i>6</i>
<i>4-inch (PVC)</i>	<i>51</i>	<i>Needed for delivery</i>	<i>No redundancy</i>	<i>6</i>
<i>2-inch (PVC)</i>	<i>51</i>	<i>Needed for delivery</i>	<i>No redundancy</i>	<i>6</i>

# Explanation of Example Prioritization Worksheet

Once the water system operator completes the System Inventory Worksheet (see page 12), he begins to work with the system managers to prioritize the assets. A number of assets will require attention within the next five years. These assets are given the highest priority.

Even though the chlorinator has a longer remaining useful life than both well pumps and the electrical components, the system managers have assigned the chlorinator the highest priority. The delivery of safe drinking water and the system's compliance with drinking water regulations depends on the chlorinator. The managers have also assigned a high priority to both well pumps and the electrical components of the pumphouse since consistent and adequate water delivery will be in jeopardy if these items are not replaced.

Deciding whether to assign the chlorinator, the pumps, or the electrical components a higher priority was a difficult decision, as all are integral to the operation of the water system. The managers know they will have to replace all of these assets if they expect to continue to provide their customers with safe drinking water. By completing the prioritization worksheet, however, the managers gave themselves some time to properly evaluate the situation, collect the necessary resources, and replace all critical assets according to a schedule that will work for the system.

The Prioritization Worksheet also helps the managers forecast future needs and allocate resources. The managers are able to inform the municipality that the distribution pipes will not require replacement for another 50 years. By not replacing the pipes before the end of their useful lives, the funds that might have been allotted to the pipe-replacing project can now be assigned to more critical projects, such as replacing the chlorinator.

The managers will need to decide how to fund the necessary rehabilitations or replacements. Based on the System Inventory Worksheet, many of the system's assets will require major rehabilitation or replacement every 10 years. The remaining worksheets in this guide will help the system managers determine how much money they will need to reserve each year and whether current revenues can cover the costs of on-going operation and rehabilitation and replacement of all of these assets. If current revenues are insufficient, they will need to seek additional sources of funding.

## Step #3 – How Do I Plan for the Future?

Now that you have prioritized your assets, you will have to determine how much it will cost to rehabilitate and replace them as they deteriorate. To properly protect public health and deliver safe water, you need to rehabilitate and replace your assets in addition to operating your water system. Many systems will need considerable lead-time to budget and gather the necessary funds. By developing an asset management plan, you will be able to allocate your resources in the most efficient way.

The Required Reserve Worksheet on the next few pages will lead you through the steps necessary to determine how much money you need to put in reserve each year (for the next five years) to fund your highest priority activities. This reserve should be protected from other use.

The worksheet will give you an idea of how much money you should set aside to fund your reserve account this year. Changes in your system's finances and costs of new assets can change from year to year. It is important that you update this worksheet every year. This will ensure that you have enough reserves to cover necessary rehabilitations and improvements. This worksheet only helps account for additional funds you will need to rehabilitate or replace your assets. Standard O&M costs (e.g., chemicals for disinfection) are not included in the calculations on this worksheet.



Remember that while the total reserves needed each year may at first seem overwhelming, it is easier to put aside \$500 a year to replace a storage tank than to pay \$20,000 to replace it when it fails. Step #4 will discuss some of your system's options for raising revenues to carry out your asset management plan. Contact your State or Regional Tribal Coordinator for additional ideas on funding options available to your system.

### Remember!

A preventive maintenance program will allow you to maximize the useful lives of your assets and can help you avoid problems and cut down or delay replacement costs. Contact your State or Regional Tribal Coordinator for more information on developing and implementing a preventive maintenance program.

# Introduction to the Required Reserve Worksheet

The following Required Reserve Worksheet will help you calculate the amount of money that you will need to set aside every year (your annual reserve) to pay for the rehabilitation and replacement of your assets. Standard O&M costs are not included.

The worksheet asks for the estimated cost of rehabilitation and replacement activities associated with your highest-priority assets. Remember to gather information on all of the costs associated with rehabilitation and replacement such as equipment purchase, installation, pilot tests, labor charges, clean up, and disposal of the replaced asset. To determine your estimated costs, you can:

- Ask local contractors and businesses for estimated costs.
- Contact equipment manufacturers.
- Talk to neighboring systems about the cost of their rehabilitations or replacements.
- Discuss this with your state, tribal, or local technical assistance organization.

This worksheet can be used to estimate your annual reserves for the next five years. The worksheet uses a five year forecast to help you think about and begin financial planning for your short-term future needs. Although several of your assets will have remaining useful lives considerably longer than five years, it is unlikely that you will be able to forecast your water system's situation much farther into the future. You should update the worksheet at least once a year because your system is likely to experience changes in costs, budgeting, and funding.

Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.



# Using the Required Reserve Worksheet

This section presents instructions for completing the Required Reserve Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 22.

## Step #1

### Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet, or start a new worksheet each year.

## Step #2

### List your prioritized assets.

- List the assets from the Prioritization Worksheet. List the assets in order, with the highest priority assets (lowest number) first.

## Step #3

### List activities.

- For each asset, list the rehabilitation and replacement activities that you expect to perform over the next five years. Provide enough detail for each activity so that you can determine the cost of the activity.

## Step #4

### Estimate years until action needed.

- For each activity, fill in the number of years before you will need to do that task.
- For annual activities, enter “1.”
- For replacement activities, enter the remaining useful life you estimated in step 8 of the System Inventory Worksheet.

## Step #5

### Estimate cost.

- Fill in the expected cost for each activity. Make sure to include the complete cost, including preparation, clean-up, removal, and disposal of any waste.
- If you expect to sell an asset at the end of its useful life, subtract the estimated sale price from the cost of a new item and enter the difference.

## Step #6

### Calculate the reserve required per year.

- For each asset, calculate the reserve required by dividing the cost by the years until the action is needed. This is the estimated amount of money that your system needs to set aside per year for that asset.

## Step #7

### Calculate the total reserve required in the current year.

- Add the reserve required per year for each item to calculate the total reserve required in the current year. This is the estimated amount of money that your system needs to set aside, starting this current year, if you want to pay for all of these rehabilitation and replacement activities.

**EXAMPLE Required Reserve Worksheet<sup>1</sup>**

Date Worksheet Completed/Updated: 8/15/02

Asset (list from highest to lowest priority)	Activity	Years until action needed	Cost (\$)	Reserve required current year
1. Chlorinator	Replace	2	\$2,000	\$1,000
	Purchase redundant unit	1	\$2,000	\$2,000
2. Pumphouse - Electrical	Replace with controller	1	\$2,000	\$2,000
3. Well Pumps	Replace Well 1 pump	1	\$5,000	\$5,000
	Replace Well 2 pump	1	\$5,000	\$5,000
	Next Replacements (2 well pumps at \$5000 each)	10	\$10,000	\$1,000
4. Valves	Replacement (45 valves at \$500 each)	31	\$22,500	\$726
5. Hydrants	Replacement (30 hydrants at \$2,000 each)	31	\$60,000	\$1,935
6. Pipe	6-inch (3600 ft. at \$20/ft.)	51	\$302,000	\$5,922
	4-inch (9500 ft. at \$20/ft. - replace 4-inch with 6 inch)			
	2-inch (2000 ft. at \$20/ft. - replace 2-inch with 6 inch) (Total is 15,100 ft. at \$20/ft.)			
7. Storage	Rehabilitate 3 tanks (1 every 8 years, 1993 and 2000 tanks)	5	\$50,000	\$10,000
	Replace - 2 tanks (1993 tanks)	31	\$40,000	\$1,290
	1 tank (2000 tank)	38	\$20,000	\$526
<b>Total reserve in the current year</b>				<b>\$36,399</b>

<sup>1</sup> Note: The Required Reserve Worksheet only helps you account for the additional funds you will require to rehabilitate or replace your asset. Standard O&M costs are not included in this calculation.

# Explanation of Example Required Reserve Worksheet

In order to calculate the funds the system will have to set aside each year to pay for the upkeep of its assets, the managers complete the Required Reserve Worksheet. By inventorying and determining the condition of the system's assets, and evaluating when they will need to be replaced, the managers realize:

- That while none of the items that require replacement within the next 1-2 years (the chlorinator, the pumps, and the electrical system for the pumphouse) is very expensive, they will have to set aside approximately \$16,000 in the next two years to cover the cost of replacing these assets.
- The replacement of pipes in this system's distribution system is by far the most costly activity for the system. It will cost an estimated \$302,000 to replace pipes, but since this cost can be spread out over 50 years, they only need to put aside an additional \$6,000 a year (every year) to fund this activity.
- The total reserve required to successfully implement this asset management plan is around \$36,500 per year.

Before beginning the asset management plan process, the managers were planning on replacing the chlorinator next year but did not plan on replacing either of the well pumps until they broke. Now, they plan on using some of the system's current reserve fund to purchase a redundant unit and to begin saving for the replacement of one of the well pumps. They also decide to meet with town officials to discuss system priorities, costs, and funding options.

## Step #4 – How Do I Carry Out This Plan?

In the previous section, you may have discovered that you should be reserving additional money every year to cover the cost of rehabilitating and replacing your assets. Preparing a financial forecast (by estimating how much revenue you expect for the next five years) will help you determine if you will need to supplement your revenues to carry out your asset management plan.

If you don't already have a five-year forecast, the Budgeting Worksheet on page 28 will help you complete this task. In addition, to increase or more efficiently use your revenues to operate and maintain your system and carry out your asset management plan you can:

- **Create additional reserve accounts.** Reserve all or some of the money you will need in a protected capital improvement reserve account and create an emergency account to fund unexpected repairs and replacements. You may be restricted in how much money can be placed in reserve accounts. Check with your state or tribal coordinator for more information. Contact information is provided in Appendix E.
- **Form partnerships.** Working with other water systems may allow you to lower costs, simplify management, and continue to provide your customers with safe drinking water.
- **Consider increasing rates.** Alternatively, consider assessing a flat fee for infrastructure improvements or funding of a reserve account. Check with your state for rate-setting information.
- **Apply for financial assistance.** Banks and government agencies can provide funds for infrastructure projects such as treatment facilities, distribution lines, and water source development. If you do not have enough funds to pay for needed capital improvements, you can apply for loans and grants. Although you will pay interest on loans which will, over the long term, increase your costs, loans will allow you to address needed system improvements without dramatically increasing rates or assessing fees to cover the costs. Seek financial advice from your city clerk, a certified accountant, or contact your State or Regional Capacity Development Coordinator if you are considering a loan to fund capital improvement projects. The table in Appendix B provides information on some programs that may provide financial assistance to help you fund major infrastructure improvement and replacement projects.



# Introduction to the Budgeting Worksheet

The following simple five-year Budgeting Worksheet will help you quickly determine:

- Your system's annual revenues from fees, loans and grants, interest from any accounts, and other sources of income.
- Your annual expenditures on maintenance, utilities, salaries and benefits, office supplies, professional services, taxes, and loan payments.
- Your net income.
- How much additional funding you will need to continue to operate and maintain your system and replace and repair your assets.<sup>2</sup>

You should complete the Budgeting Worksheet every year. It will allow you to assess your financial situation and properly plan for future needs. Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

The budgeting worksheet is intended to help you understand the financial position of your system and forecast any potential shortfalls you may face. It will help you determine whether or not you are adequately funding your reserve account(s) and whether or not you should begin searching for additional funding sources. It *is not* meant to serve as an accounting tool, nor is it intended to replace your current accounting practices.

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<sup>2</sup> The Budgeting Worksheet does not take into account current reserves or your annual contributions to other reserve accounts. If you already have reserve accounts, you can use them to supplement your asset management plan. It is important, however, to continue contributing to these reserve accounts so that you don't experience a shortfall if you use these funds for repair and replacement of assets.

## Budgeting Worksheet

Date Worksheet Completed/Updated: **1** \_\_\_\_\_

<b>2 Revenues</b>	<b>4 Expenses</b>	<b>6 Net Income</b>
<p>Service Fees: _____</p> <p>Fees and Service Charges (late fee, connection fee, fire fee, etc.): _____</p> <p>Impact Fees (demand fee, system development fee, etc.): _____</p> <p>Secured Funding: _____</p> <p>Interest: _____</p> <p>Other: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Maintenance: _____</p> <p>Utilities (power, telephone): _____</p> <p>Salaries and Benefits: _____</p> <p>Equipment Cost: _____</p> <p>Chemicals: _____</p> <p>Monitoring and Testing: _____</p> <p>Rent or Mortgage: _____</p> <p>Insurance: _____</p> <p>Professional Services (legal, accounting, engineering, etc.): _____</p> <p>Training Costs: _____</p> <p>Billing Costs: _____</p> <p>Fees (state PWS fee, franchise fee, conservation fee, etc.): _____</p> <p>Security: _____</p> <p>Other (debt payments, taxes, miscellaneous, etc.): _____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p><b>Total Revenues:</b> _____</p> <p><b>Total Expenses:</b> _____</p> <p><b>Net Income</b> <b>(Revenue - Expenses):</b> _____</p> <hr/> <p style="text-align: center;"><b>Additional Reserves Needed</b></p> <p><b>7 Total Required Reserves:</b> _____</p> <p style="text-align: center;"><b>8 Net Income:</b> _____</p> <p><b>9 Additional Reserves Needed</b> <b>(Income - Required Reserves):</b> _____</p>
<b>3 Total Revenues:</b> _____	<b>5 Total Expenses:</b> _____	

# Using the Budgeting Worksheet

This section presents instructions for completing the Budgeting Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 28.

## Step #1

### Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet once a year. You can either make minor adjustments to the worksheet, or start a new worksheet each year.

## Step #2

### List your revenues.

- Fill in your revenues in the lines provided. If your system has other sources of income not listed on the worksheet, enter them in the “Other” lines provided.

## Step #3

### Calculate total annual revenues.

- Calculate your total revenues by adding all the revenues you listed in the previous step. Enter this number in the box marked “Total Revenues.” Do not include funding you expect but have not secured.

## Step #4

### List your expenses.

- Fill in your expenses in the lines provided. If your system has other expenses not listed on the worksheet, enter them in the “Other” lines provided.

## Step #5

### Calculate total expenses.

- Calculate your total expenses by adding all the expenses you listed in the previous step. Enter this number in the box marked “Total Expenses.”

## Step #6

### Calculate net income.

- Enter the result of step 3 on the “Total Revenues” line and the result of step 5 on the “Total Expenses” line. Calculate your net income by subtracting your expenses from your revenues. Enter this number on the “Net Income” line.

## Step #7

### Enter your total required reserves.

- Enter your total required reserves from the Required Reserves Worksheet.

## Step #8

### Enter your net income.

- Enter the result of step 6 on the “Net Income” line.

## Step #9

### Calculate additional reserves needed.

- Subtract your total required reserves (from step 7) from your net income (from step 8). Enter this number in the box marked “Additional Reserves Needed.”
- If the result is a positive number (i.e., your resources are larger than your required reserves), you will not have to plan for ways to make up for the shortfall and can set aside the required funds in a reserve account.
- If the result is a negative number (i.e., your resources are less than the required reserves), you should start planning for ways to make up for the shortfall.

**EXAMPLE Budgeting Worksheet**

Date Worksheet Completed/Updated: 8/14/02

Revenues	Expenses	Net Income
Service Fees: <u>\$249,971</u>	Maintenance: <u>\$54,320</u>	<b>Total Revenues:</b> <u>\$255,430</u>
Fees and Service Charges (late fee, connection fee, fire fee, etc.): <u>\$5,284</u>	Utilities (power, telephone): <u>\$3,992</u>	<b>Total Expenses:</b> <u>\$245,072</u>
Impact Fees (demand fee, system development fee, etc.): <u>\$175</u>	Salaries and Benefits: <u>\$76,689</u>	<b>Net Income</b>
Secured Funding: _____	Equipment Cost: <u>\$1,371</u>	<b>(Revenue - Expenses):</b> <u>\$10,358</u>
Interest: _____	Chemicals: <u>\$40,512</u>	
Other: _____	Monitoring and Testing: <u>\$8,096</u>	
_____	Rent or Mortgage: _____	
_____	Insurance: <u>\$1,453</u>	
_____	Professional Services (legal, accounting, engineering, etc.): <u>\$400</u>	
	Training Costs: <u>\$1,000</u>	
	Billing Costs: <u>\$2,500</u>	
	Fees (state PWS fee, franchise fee, conservation fee, etc.): <u>\$500</u>	<b>Additional Reserves Needed</b>
	Security: <u>\$609</u>	<b>Total Required Reserves:</b> <u>\$34,625</u>
	Other (debt payments, taxes, miscellaneous, etc.): <u>\$53,630</u>	<b>Net Income:</b> <u>\$10,358</u>
	_____	
	_____	
	_____	<b>Additional Reserves Needed</b>
		<b>(Income - Required Reserves):</b> <u>-\$24,267</u>
<b>Total Revenues:</b> <u>\$255,430</u>	<b>Total Expenses:</b> <u>\$245,072</u>	

# Explanation of Example Budgeting Worksheet

In order to better understand their financial position, the managers for the water system must complete the budgeting worksheet. Note that almost all of their revenues come from service fees (\$249,971 of \$255,430 in total revenues). Most of their expenditures go to pay for maintenance, salaries and benefits, and chemicals.

On the surface, it would seem that the system is in a fairly good financial situation. After expenses, it has a net income of \$10,358 a year. However, the system cannot afford the annual \$34,625 contribution to its reserve account with its current income. If the system does not raise revenues or secure outside funding, it will not have the income necessary to pay for rehabilitation and replacement of its assets in the future. The water system managers will have to start thinking about how to raise the additional revenue necessary to make up for the shortfall.

## Step #5 – What Should I Do Next?

Once you have inventoried and prioritized your assets, determined how much money you will need to set aside each year to fund the rehabilitation and replacement of your assets, and explored funding options for your water system, you can use your asset management plan to help plan your water system's future. You will have a good picture of when you will need to replace your assets and how much money you will need to fund those replacements and continue to deliver safe and secure drinking water to your customers.

Remember that the worksheets should be reviewed, revised, and updated on an annual basis. Your asset management plan should help you shape your system's operations and should change as your priorities change. Current information in the worksheets provides a better picture of your system's position, and better prepares you to meet your water system's future needs.

Taken in tandem with the strategic planning tools available in EPA's Strategic Planning STEP Guide (EPA 816-R-03-015), the worksheets will give you a good idea of the challenges your system may face in the future and help you think about the most cost-effective and efficient way to address those challenges. Consulting with your State or Regional Capacity Development Coordinators and developing a plan of action with their assistance will ensure that you can continue to deliver safe and secure drinking water well into the future.









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<b>Budgeting Worksheet</b>		
Date Worksheet Completed/Updated: _____		
<b>Revenues</b>	<b>Expenses</b>	<b>Net Income</b>
Service Fees: _____  Fees and Service Charges (late fee, connection fee, fire fee, etc.): _____  Impact Fees (demand fee, system development fee, etc.): _____  Secured Funding: _____  Interest: _____  Other: _____ _____ _____ _____	Maintenance: _____  Utilities (power, telephone): _____  Salaries and Benefits: _____  Equipment Cost: _____  Chemicals: _____  Monitoring and Testing: _____  Rent or Mortgage: _____  Insurance: _____  Professional Services (legal, accounting, engineering, etc.): _____  Training Costs: _____  Billing Costs: _____  Fees (state PWS fee, franchise fee, conservation fee, etc.): _____  Security: _____  Other (debt payments, taxes, miscellaneous, etc.): _____ _____ _____ _____	<b>Total Revenues:</b> _____  <b>Total Expenses:</b> _____   <b>Net Income</b> <b>(Revenue - Expenses):</b> _____
		<b>Additional Reserves Needed</b>
		<b>Total Required Reserves:</b> _____
		<b>Net Income:</b> _____
		<b>Additional Reserves Needed</b> <b>(Income - Required Reserves):</b> _____
<b>Total Revenues:</b>	<b>Total Expenses:</b>	

## Appendix B: Sources of Financial Assistance to Drinking Water Systems

System improvements can be funded by raising rates, issuing bonds, or by successfully applying for loans or grants. The table below provides information on some programs that may provide financial assistance to help you raise the money your system will require to maintain its assets in good condition, replace deteriorated assets, and continue to provide safe and secure drinking water to your customers. Consult with your State or Regional Capacity Development Coordinator and the Public Service Agency in your state for additional information. For other potential sources of financing or financial assistance for drinking water systems, see EPA's Water Finance Clearinghouse website: <https://ofmpub.epa.gov/apex/wfc/f?p=165:1>

Major Providers of Financial Assistance to Drinking Water Systems		
Name of Program	Description	Contact Information
Drinking Water State Revolving Fund (DWSRF)	These state-administered loans enable water systems to finance infrastructure improvements, provide training, and fund source water protection activities.	<a href="https://www.epa.gov/drinkingwatersrf">https://www.epa.gov/drinkingwatersrf</a>
Rural Utilities Service (RUS) Water and Wastewater Loan and Grant Program	This program offers loans and grants to develop water and waste-disposal systems in rural areas to reduce user costs.	<a href="https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program">https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program</a>
State-specific programs	Your state may offer additional funding programs.	<a href="https://www.epa.gov/dwcapacity/find-epa-capacity-development-contact">https://www.epa.gov/dwcapacity/find-epa-capacity-development-contact</a>
Tribal-specific programs	EPA gives grants (not loans) to tribes through the DWSRF Tribal Set-Aside program for improvements to water systems that serve tribes. States and the Indian Health Service may provide additional financial assistance.	<a href="https://www.epa.gov/tribaldrinkingwater/regional-tribal-drinking-water-coordinators">https://www.epa.gov/tribaldrinkingwater/regional-tribal-drinking-water-coordinators</a>

## Appendix C: Introduction to GASB 34

The Governmental Accounting Standards Board (GASB) is a private, nonprofit organization that is responsible for establishing and improving governmental accounting and financial reporting standards. GASB also establishes generally accepted accounting principles (GAAP) for state and local governmental entities, including publicly-owned water systems.<sup>3</sup> The standards and principles developed by GASB are strictly voluntary. However, some states may incorporate them into their laws and regulations and therefore make them mandatory for local governments and the water systems they operate.

In June 1999, GASB approved “Statement Number 34, Basic Financial Statements and Management’s Discussion and Analysis for State and Local Governments.”<sup>4</sup> Statement Number 34 revised several accounting practices and established new standards for the annual financial reports required of state and local governments. The revisions were intended to make annual financial reports easier to understand and make the financial data more useful to decision makers.

GAAP and GASB 34 make good sense for publicly-owned water systems as these principals are often the best way to keep track of finances. Following them will help you form a better picture of your system’s financial health, forecast future shortfalls, and continue to deliver safe drinking water to your customers. In addition, following GASB standards is a must for obtaining a “clean opinion” (i.e., a good credit rating) from an auditor. Clean opinions are often necessary for loans, negotiating favorable interest rates, or issuing bonds.

GASB 34 requires:

1. An accounting of revenues and expenditures in the period in which they are earned or incurred. This is called accrual-based accounting. For example, if the water system provides water in December 2003 and receives payment in February 2004, the water system would report that the money was earned in 2003. This change will allow the system and its investors to understand the direct financial results of its investments.

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<sup>3</sup>The Financial Accounting Standards Board (FASB) establishes and improves standards of financial accounting and reporting in the private sector. If your system is privately owned, visit [www.fasb.org](http://www.fasb.org) for more information on private accounting standards.

<sup>4</sup>The new standards took effect for small governments (including water systems) with annual revenues of less than \$10 million on June 15, 2003.

2. A reporting of the value of infrastructure assets and the cost of deferred maintenance. These measures allow the public to evaluate how well the system is managing its assets. A current asset management plan is a valuable tool to help you meet this requirement if you are complying with Statement 34. In addition, reporting the true cost of deferred maintenance (i.e., unmade repairs that result in equipment or facility deterioration) may allow systems to more easily raise money for maintenance activities necessary to use facilities and equipment for their full expected lives.
3. Contributed capital (for example, federal grants) to be considered a form of income. This change will increase a system's reported income. While reporting all forms of income is a necessary accounting principal, this method of reporting (which includes contributed capital) may make it more difficult to justify rate increases.

For more information, talk to your city clerk, ask a certified public accountant, or contact your State or Regional Capacity Development Coordinator. GASB's website offers more information on Statement 34, as well as guidance documents, case studies of entities that have implemented Statement 34, and trainings. Visit [www.gasb.org](http://www.gasb.org) for more information.

# Appendix D: Other Resources

This brochure is one in a series of Simple Tools for Effective Performance (STEP) documents for small drinking water systems. The STEP Guide documents can be downloaded from the EPA website at:

<https://www.epa.gov/dwcapacity/simple-tools-effective-performance-step-guide-series>.

For more information on asset management, visit <https://www.epa.gov/dwcapacity/asset-management-resources-small-drinking-water-systems-0>

## Additional Organizations

- American Water Works Association: [www.awwa.org](http://www.awwa.org)
- Association of Metropolitan Water Agencies: [www.amwa.net](http://www.amwa.net)
- Association of State Drinking Water Administrators:  
[www.asdwa.org](http://www.asdwa.org)
- Government Finance Officers Association: [www.gfoa.org](http://www.gfoa.org)
- National Association of Regulatory Utility Commissioners:  
[www.naruc.org](http://www.naruc.org)
- National Association of Water Companies: [www.nawc.org](http://www.nawc.org)
- National Rural Water Association: [www.nrwa.org](http://www.nrwa.org)
- Rural Community Assistance Program: [www.rcap.org](http://www.rcap.org)
- Rural Utilities Service: [www.usda.gov/rus](http://www.usda.gov/rus)
- Environmental Finance Center Network: <http://efcnetwork.org/>