Small Community Assistance Planning Asset Management Tool: Guide for Tool Users

Overview

Tool Purpose

This guide is intended for users of the Small Community Assistance Planning (SCAP) Asset Management Tool to track either wastewater or drinking water assets and conduct a basic condition and criticality assessment. The User Guide is organized according to the steps within the tool and provides general instructions as well as specific definitions and directions for individual questions on each sheet. The sections of the Guide correspond with the worksheets in the tool.

The purpose of the SCAP Asset Management Tool is to facilitate tracking and basic assessment of drinking water or wastewater assets. The tool includes the following components:

1. Asset Inventory
2. Condition Assessment
3. Vulnerability Assessment
4. Critical Assets

The SCAP Tool was designed to be a "living document." It allows for ongoing tracking and updates of your utility's asset inventory, condition assessment, and vulnerability assessment. Revisit the tool regularly over time to add, delete, or modify data as needed. The outputs of the tool are intended to inform decisions on asset repair and replacement.

The organization tool follows a basic left-to-right format. Users should work from left-to-right through the tool (both across and within sheets) to ensure information is added correctly and calculations are correct. Some cells are automatically populated with information. These cells are locked to prevent accidental deletion or modification of formulas.

The tool also uses a color-coding system:

Red tab indicates the primary information for tracking assets and must be completed first.
Green tabs are assessment tabs with questions about each asset and calculated scores.
Gray tabs contain supplemental information including tracking information and guidance.

Within each sheet, and across the entire tool, the following color-coding system is used for individual columns:

Blue cells contain dropdown menus for selection.
Red cells are for manually entering information.
Yellow cells are auto-filled but can be overwritten in some cases.
Gray cells are for manually entering *optional* information.
Green cells are calculated values and cannot be changed.

System Requirements

This tool was built on Windows 10 using Excel (Microsoft Office) 2016. Wherever possible, EPA used formulas and formatting that are compatible with older versions of Excel. EPA developed two versions of the tool, described in the text box below. The tool is *not* currently designed to work with other spreadsheet software such as Google Sheets or on mobile devices.

EPA has developed two versions of the Small Community Assistance Program (SCAP) Tool: macro-enabled and non-macro. Users with Microsoft Office 2016 or Office 365 can use the macro-enabled version. Users with older versions of Microsoft Office are encouraged to try the macro-enabled version first. If it does not work, download and utilize the non-macro version. The only significant difference between the two versions is:

Macro-enabled version = **Users can add/delete rows and use the Excel filter and sort functionality.**

Non-macro version = **Sheets are locked to prevent users inserting rows or reordering lists. If using the non-macro version, make sure to add assets in a logical order (for example, add all valve assets before moving on to treatment assets).**

If you are using the macro-enabled version, be sure to click "Enable Macros" if this prompt appears near the top of the spreadsheet when first opened.

Basic Information

Worksheet Overview

The first sheet in the SCAP Tool tracks basic utility information. This sheet prompts you to enter that information. You can add rows if needed to record additional information. Each time new information is added, update the Basic Information sheet to reflect the date that the tool was used and the name of the person making changes. You should also consider renaming the file each time you update the tool. This will also help track changes over time. For example, naming the file "SCAP_Tool_DW_01182019" indicates that the tool was completed on January 18. 2019. If the tool is updated on July 7, 2022, a new file could be saved as "SCAP_Tool_DW_02072022."

Small Community Assistance Planning (SCAP) Tool
Drinking Water Assets
U.S. Environmental Protection Agency Region 7

Move left to right to ensure the accurate dropdown menus are available for selection.

Cells colored Blue contain dropdown menus for selection.

Cells colored Red are for manually entering information.

Cells colored Yellow are auto-filled, but can be overwritten.

Cells colored Gray are for manually entering optional information.

Cells colored Green are calculated output values.

FILL IN THE INFORMATION BELOW	
Utility Name:	
Utility Location:	
Date of Inventory:	
System Capacity:	
Population Served:	
Number of Connections:	
Assessor Name:	

This inventory is for DRINKING WATER assets only. Utilities with wastewater assets should complete a separate inventory using the Wastewater tool.

Figure 1. Screenshot showing sheet "0a_Basic Information"

Definitions and Instructions

1. Fill out this tab each time an assessment is conducted
   a. If you are making minor updates to inventory data but have not conducted a completely new assessment, keep the date of the most recent complete assessment

Utility Name = Name of the utility for which asset information will be entered in the tool

Utility Location = Address of administrative office and/or community name (if different from utility name)

Date of Inventory = Date on which the most current inventory data were entered in the tool

System Capacity = Total available capacity (distribution/collection/treatment) or actual operating capacity

- Choose the capacity that is most relevant for your utility (e.g., average daily demand, maximum capacity, etc.)
- Recording capacity is useful if the tool is used iteratively and capacity changes over time
- Make sure to specify which value is being reported (total capacity, operating capacity, etc.) and the units (e.g., gallons per minute, gallons per day, MGD, etc.)

Population Served = Current estimate of total population served

Number of Connections = Current estimate of total residential, commercial, and industrial connections

Name of Staff Completing Inventory = Name of person who entered the most current inventory information

Additional Resources

- This tab provides links to resources that you may find helpful for completing the tool.

Asset Inventory

Background

An asset inventory is a comprehensive record of utility assets. A complete inventory should include buried and above-ground infrastructure, vehicles, computers and other information technology (IT) components, and utility buildings. Compiling this inventory, and basic information about each asset, is a very important first step in the asset management process. Because developing an asset inventory can be time-consuming, you may want to prioritize what assets to include in your inventory, and build it out to include all assets, over time.

> If a pop up or drop-down box is blocking your ability to enter data, the "Esc "key will make the box disappear.

Worksheet Overview

The "Asset Inventory" worksheet is the primary tracker for your utility's assets. Use this tab to record each asset and relevant information needed to assess condition, vulnerability and criticality later in the tool. The tool allows you to choose the level of detail appropriate for your use. For example, you can list all your utility's PVC pipe on one line, or you can break out pipe by size or areas of town.

Note that some information is required, while other information is optional. The data entered in this worksheet are the basis for all other information and calculations in the remaining worksheets in the tool. You can choose the level of detail that will be most helpful to your utility.

Hiding Rows and Columns

The first seven rows provide instructions and access to additional resources. Once you are familiar with the tool, you may not need access to these. If so, consider "hiding" those rows. This will accommodate viewing more rows of asset information. However, be careful not to delete those rows as it will have an impact on formulas and functionality of the tool.

Similarly if there are some columns that are less useful to you, they may be hidden as well. Again, do not delete columns, and be careful not to hide columns for which entries are required (Asset Category, Asset Type, Estimated Useful Life, Estimated Installation Date, Remaining Useful Life, and Operational).

Protect/Unprotect Buttons

For the versions of the tools that are macro-enabled, the Asset Inventory sheet has "buttons" that allow the user to protect and unprotect the sheets. The file will open up in protect mode to help ensure that the user does not make unintended changes to the file that may affect its functionality. However, if you want to make changes such as deleting one of the asset rows, entering data manually over a pre-filled entry, filtering, or sorting, you can select the "Unprotect sheets" button and it will allow you access to these options.

Figure 2. Screenshot showing sheet "1_Asset Inventory"

Definitions and Instructions

Asset Category = Groups of asset types

1. Select Asset Category from the available dropdown menu or enter a custom asset category if necessary. Note that if you select one of the pre-set categories and asset types, the tool will provide an "Estimated Useful Life" for each asset. If a custom category is entered, you will need to manually enter Estimated Useful Life as described below.
    a. Selection of Asset Category will determine which Asset Types appear in the dropdown menu in Column B.

Asset Type = Specific asset types within each asset category

a. Select the Asset Type from the available dropdown menu or enter a custom asset type if necessary. As noted above, if you select one of the pre-set asset types, the tool will provide an "Estimated Useful Life" for each asset. If you enter a custom category, the tool will be unable to generate this value and you will need to enter one manually as described below. The dropdown menu for Asset Type will only appear if an Asset Category was selected from the dropdown menu. If a custom asset category is entered, you will need to also specify a custom asset type.

Asset Description = Specific name or description of each asset. This description defines or identifies each asset. You can provide whatever level of detail is most helpful for your utility.

1. Manually enter an Asset Description to provide more detail for each asset and to distinguish between multiple assets of the same category or type.
    a. For example, if the asset category is "Pump" and the asset type is "Booster" the Asset Description could be "Booster Pump #2 (Main St.)" to distinguish from other booster pumps in the system.
2. Try to add each individual asset in the inventory as a separate row, rather than lumping multiple assets of the same category and type in a single row. This will allow for assessment of individual asset condition and vulnerability in subsequent worksheets. However, if there are multiple assets of the same category and type that were installed at approximately the same time, the tool is designed to allow you to lump them together in one row (by specifying the number of assets).

5

System Area = If helpful, you can identify an area of the system with which assets are associated. This can be used later when the tool has many entries to sort or filter by area. For instance, you may identify all assets at a given source by that source's name, all assets at a given treatment plant with the plant's name, or distribution/collection service areas by a name associated with that area.

Asset ID = This is a unique identifier for each asset. It will facilitate inventory tracking and, if desired, entry of asset information into a Geographic Information System (GIS).

1. ASSET ID IS AUTOMATICALLY-GENERATED BY THE TOOL – you do not need to enter your own Asset ID unless you have an existing asset ID system or wish to use an alternative identification scheme.
2. It is possible to manually enter your own, alternative ID in the Asset ID column.
   a. A warning message will appear as shown below. To proceed with entering a custom asset ID, click "Yes."
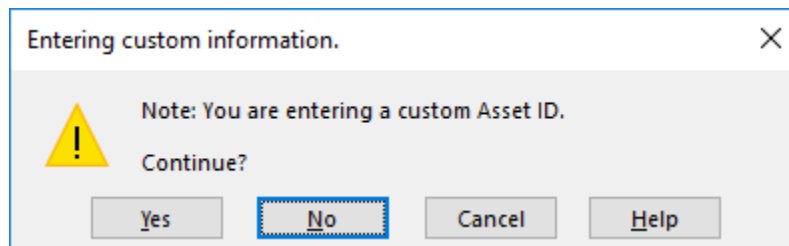
Figure 3. Warning message that appears when manual information is entered for Asset ID in sheet "1_Asset Inventory"

Note on Asset ID: The ID that is automatically generated by the tool uses a formula that is dependent on the order in which each asset category/type combination appears in the inventory. The ID numbers will therefore change if the list is reordered or a new asset of the same type is inserted in a new row above another. When you are adding new assets or reordering the list, first copy the Asset ID column and paste it into the Alternate Asset ID column to maintain the order from the original assessment.

Estimated Useful Life = This is an auto-filled estimate of the useful lifespan for an individual asset. These estimates are often derived from the average lifespan of that type of asset historically. Estimates included in the SCAP Tool were pulled from several sources including the Southwest Environmental Finance Center Asset Management Database, EPA asset management guidance documents, state environmental program websites, the Sustainable Infrastructure Management Program Learning Environment (SIMPLE) guidance, and manufacturers' product information. The Estimated Useful Life and Estimated Installation Date (see below) are used to automatically calculate the asset's Remaining Useful Life.

1. If you used the dropdown menus to select Asset Category and Asset Type, the tool will automatically enter an Estimated Useful Life.
2. If you believe that the asset's Estimated Useful Life is longer or shorter than the auto-populated value, you may manually enter an alternative value, *in years*.
3. For a custom value entry, a warning message will appear as shown below – proceed with a custom entry by clicking "Yes."
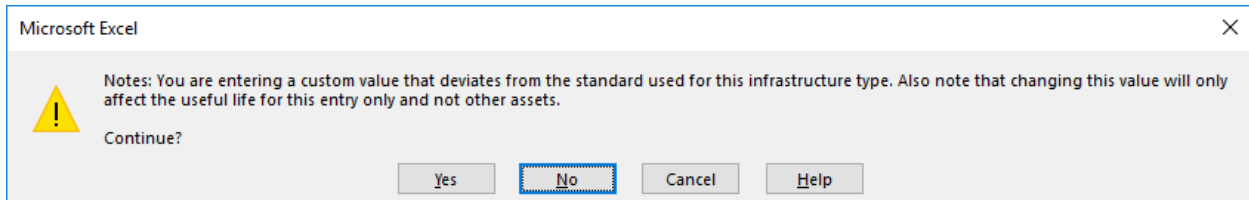
Figure 4. Warning message that appears when custom information is entered for the Estimated Useful Life column in sheet "1_Asset Inventory"

<u>Estimated Installation Date</u> = Estimated date (in MM/DD/YYYY) on which an asset was installed, or the best estimate for installation date based on records. You can also choose to enter an alternative date, for example the date an asset came on line, if it makes more sense when considering useful life.

1. Manually enter the Estimated Installation Date. For the program to calculate a Remaining Useful Life, this entry must be in in MM/DD/YYYY format. If you do not know the month and day, just enter 01/01/YYYY.
    a. DO NOT ENTER YEAR ONLY.

<u>Remaining Useful Life</u> = This field is a calculation of the estimated remaining lifespan (in years) for a given asset. The remaining life value is used later in the tool to calculate the asset's Probability of Failure.

The tool automatically calculates a value in years based on the current date. This value will recalculate each time the tool is opened. Over time, if the tool is used repeatedly, the Remaining Useful Life value will update based on the current date.

1. In most cases, you should NOT enter a custom value for Remaining Useful Life, even if a custom value was provided for Estimated Useful Life.
2. You may manually enter a custom value if there is a compelling reason to do so (for example, if an asset were removed or taken offline for an extended period).

<u>Location</u> = The asset location is a manual entry optional field. It can be GIS coordinates (latitude/longitude), an address, or other identifier (e.g., "Northeast Well Field"). Including an asset location is an important component of the asset inventory but does not affect any calculations made in the tool. Try to enter location information that would help with entry of assets into a GIS map, if you do not already have one.

1. Manually enter asset location in whatever format is most helpful to your utility.

<u>Comments for Inspection, Rehab, or Repair</u> = This field can be used to keep track of inspection, rehabilitation, or major maintenance work completed for an asset. For instance, you may enter the year in a well was last rehabilitated or when a tank was last inspected or painted.

<u>Operational</u> = Current status of the asset, defined as whether the asset is currently in use as a component of the system. Try to include all assets that may become operational in the future even if they are not currently in use. The current status of the asset has no impact on any calculations in the assessment sheets of the tool; it is purely for record-keeping purposes.

1. Answer the question "Is the asset currently operational?" by selecting from the dropdown menu. Possible answers include: "Yes", "No", or "Unknown."

Alternate Asset ID (optional) = This is an optional field for manual entry of an existing asset ID or the IDs defined by the tool in the Asset ID column during a previous assessment.

Size/Capacity (optional) = This is an optional field to provide additional asset details such as pipe diameter, valve size, pump capacity, and similar details.

1. If desired, manually enter information on Size/Capacity. The information included in this column is only used for inventory purposes and does not affect calculations on other worksheets.

Number/Length (optional) = This is an optional field to specify additional details for assets such as number of a given type of asset or length for pipe.

1. If desired, manually enter information on number of assets of the specified category and type, and/or pipe length to further distinguish pipe assets from one another.

Product Information (optional) = This is an optional field to indicate the vendor from which an asset was procured or the manufacturer. The tool allows for entry of several vendors/manufacturers in the separate "Product List – USER SHEET" worksheet to ensure consistency where possible. You can either select from a dropdown menu if the product list is populated or enter a vendor/manufacturer manually. Vendor/manufacturer identification has no impact on any calculations in the assessment sheets of the tool.

1. To track product information using the product list dropdown menu option, click the "Product List – USER SHEET" tab.
    a. Table headers match the asset categories that appear in the Asset Category dropdown menu.
2. Enter vendor(s) or manufacturer(s) for each asset category under the appropriate header. If adding more than one line, ensure that each table includes all added vendors as shown in the screenshot below. Note that in the incorrect version the second hydrant vendor is not included in the table.

Pump Product	Contact Info	Hydrant Product	Contact Info
Pump Vendor 1		Hydrant Vendor 1	
Pump Vendor 2			
Pump Vendor 3		Hydrant Vendor 2	

Correct   Incorrect

Figure 5. Demonstration of how to ensure the Product Lists are set up properly in sheet "3a_Product Lists - USER SHEET"

3. After vendors are added in "Product List – USER SHEET" worksheet, return to the "Asset Inventory" worksheet and select from the dropdown menu in the Product Information column. The dropdown menu will automatically appear for all assets of that category if information is added to the lists as described in Step 2. There is no need to repeat the process unless a new vendor/manufacturer needs to be added to the list.

4. If manual entry of product information is preferred, type the vendor/manufacturer in and click "Yes" in the warning message that appears.
5. There is also a field next to each vendor in which contact information such as the name, phone number, and e-mail address can be entered. This can be a helpful way to track contact information for current and future operators and owners.

Estimated Replacement Cost (optional) = This is an optional field to provide estimates of asset replacement cost. This information is for tracking purposes only or to facilitate a basic cost assessment when determining assets that should/can be replaced.

Model Name/Number (optional) = This is an optional field to track asset model number if information is available and tracking is desired.

Serial Number (optional) = This is an optional field to track asset serial number if information is available and tracking is desired.

Additional Resources
Asset Management: A Guide for Water and Wastewater Systems
Asset Management: A Handbook for Small Water Systems
Asset Management for Small Utilities
Sustainable Infrastructure Management Program Learning Environment
Taking Stock of your Small Water System: A Simple Asset Inventory for Very Small Water Systems

Condition Assessment
Background
A condition assessment is an evaluation of the condition your assets are in, based on age, use, repair frequency, and other factors. After compiling your asset inventory, this condition assessment is the next key step in understanding what assets are most at risk of failure. While it can be challenging to assess the condition of your assets, particularly buried assets, this worksheet uses basic information that most utilities should have available to develop a general understanding of condition.

Worksheet Overview
The Condition Assessment component of the SCAP Tool calculates a condition score based on a qualitative evaluation of asset condition and reliability. Higher scores indicate a higher level of concern. The score produced in this sheet is used to calculate Combined Score and associated asset priority ranking later in the tool.

Figure 6. Screenshot of sheet "2a_Condition Assessment"

Definitions and Instructions

Information in first three columns in the Condition Assessment sheet—Asset Category and Type, Asset Description, and Remaining Useful Life—is pulled the Asset Inventory sheet. These columns are locked in this sheet and *cannot be modified*. To change the information in any of these fields, make edits to the corresponding asset in the Asset Inventory sheet. The Condition Assessment Score is a defined calculation and cannot be modified.

Current Condition of Asset = This is a qualitative assessment of asset condition based on your best judgement and understanding of the asset and your utility. For additional guidance on conducting an asset condition assessment, review the Condition Rating Guidance worksheet (described below) or refer to the additional Resources listed at the top of the sheet. You may consider many different factors when assessing condition, including date of and findings recent inspections of the asset and frequency of inspection.

1. Select the best response to the question "What is the current condition of the asset?" using the dropdown menu. Manual entry of values is not allowed because the response drives calculation of the Condition Assessment Score.
    a. Responses: Excellent, Good, Fair, Poor, Very Poor
2. To the extent possible, try to use the same standard for each response across all assets. For example, a condition rating of "Excellent" for a pump asset should be comparable to "Excellent" for a pipe asset.

       a. See the Condition Rating Guidance worksheet for examples of how to ensure this type of consistency across asset types.
3. If the tool is used iteratively as "living document," make sure that everyone using the tool follows the same approach for determining their responses.

Reliability = This field is an assessment of whether an asset needs rehabilitation or repairs that are not part of expected, routine maintenance. "Routine maintenance" means standard practices to keep the asset in working condition, such as calibrating a pump. "Repairs" refers to work beyond what would be expected for maintenance, such as rebuilding a pump. This question is intended to identify the assets that are experiencing problems more frequently than you would expect, based on asset age, type, location, use level, etc.

1. Select the best response to the question "Does the asset need frequent repairs in addition to routine maintenance?" using the dropdown menu. Manual entry of values is not allowed because the response drives calculation of the Condition Assessment Score.
       a. Responses: Yes, No, Unknown

Condition Assessment Score = The condition assessment score is a formula based on the condition rating and the response to the reliability question.

Additional Resources
Asset Management for Your Water System
Asset Management Manual: A.M. Kan Work! - Section 3 and Appendix A
Condition Assessment Strategies and Protocols for Water and Wastewater Utility Assets - Appendix C
Fundamentals of Asset Management - Slide 15

Condition Rating Guidance
The Condition Rating Guidance sheet is for reference only. It includes guidance on evaluating asset condition for all asset categories included in the tool. The condition ratings included in this sheet match the possible responses for the Condition Assessment sheet (Excellent, Good, Fair, Poor, Very Poor). Additional guidance for conducting a condition assessment for specific assets is included in the Additional Resources section of the Condition Assessment sheet.

This guidance sheet is provided to help to ensure that responses are consistent across all asset types and for all users of the tool. It is important that all assets are evaluated consistently.

Vulnerability Assessment
Background
A vulnerability assessment evaluates the relative risks of individual asset failure to your utility and your community. Vulnerability is a combination of the likelihood or probability of failure and possible consequences of a failure such as regulatory non-compliance, public health risk, or service interruption.

Worksheet Overview
The Vulnerability Assessment sheet includes calculations for each asset's Consequence of Failure (CoF) and Probability of Failure (PoF). These are important considerations when evaluating overall asset

criticality and prioritizing assets for repair or replacement. The CoF and PoF calculations contribute to the criticality assessment conducted in the Critical Assets worksheet.

- Consequence of Failure (CoF) = The CoF is an estimate of how problematic an asset's failure would be. In this tool, it is based on importance of the asset, regulatory compliance, and public health and environmental concerns.
- Probability of Failure (PoF) = The PoF is an estimate of the probability that a given asset could fail. In this tool, it is based on estimated remaining life, capacity, reliability, and repair schedule.

Figure 7. Screenshot of sheet "2b_Vulnerability Assessment"

Definitions and Instructions

Information in the first three columns in the Vulnerability Assessment sheet – Asset Category and Type, Asset Description, and Condition Assessment Score – is pulled from earlier responses in the tool and cannot be changed. Column I (Estimated Remaining Life) and Column K (Reliability) are also locked for editing. These columns are locked in this sheet and cannot be changed.

Redundancy or Back-Up = This field indicates whether there is redundancy for the asset and/or if back-up assets are available if the asset fails. The difference between redundancy and back-up is whether a "secondary" asset is already installed. For example, a well is redundant if there are one or more other wells on-line to meet maximum daily demand if any one well goes off line. Similarly, for wastewater, if a pump station has multiple pumps that could meet firm capacity if one fails, the pump station could be considered to have redundancy.

An example of a back-up asset is having a well pump that is not in use but can be installed immediately if the existing pump fails. Similarly, for wastewater, having a spare pump at the city shop provides back-up. For the purposes of the tool, redundant and back-up assets are considered equal even if minor interruption to service would occur if a back-up asset needed to be installed.

1. Select the most appropriate response to the question "Does your asset have redundancy, or do you have a back-up asset on hand, or could you easily acquire one?" from the dropdown menu. Manual entry of values is not allowed because the response is a component of the criticality assessment in the Critical Assets sheet.
    a. Responses: Yes, No, Unknown

Importance = This field is an indication of the importance of a given asset to the system overall. In this tool, asset importance is represented by the percent of customers that could lose service if the asset fails. If an asset is fully redundant, there may not be much impact to service in the event of asset failure. Use your best judgement when providing an estimate of the potential loss of service due to asset failure.

1. Select the most appropriate response to the question "How many customers could lose service if the asset fails?" using the dropdown menu. Do not overthink your response to this question. An estimate of service loss percentage is sufficient. Manual entry of values is not allowed because the response drives calculation of the CoF score.
    a. Responses: None, Less than 25%, 25-50%, 50-75%, Greater than 75%

Regulatory Compliance = This field identifies the relationship between a given asset and regulatory compliance. For example, if a drinking water system has a history of coliform-positive samples in the distribution system, the failure of a chlorinator might lead to a Total Coliform Rule violation. For wastewater, failure at a pump station may lead to an illegal bypass.

1. Select the most appropriate response to the question "Could asset failure lead to compliance issues or regulatory violations?" from the dropdown menu. Manual entry of values is not allowed because the response drives calculation of the CoF score.
    a. Responses: Yes, No, Unknown
2. Make sure that all tool users understand the relationship between assets and regulatory compliance.

Public Health and Environmental Concerns = This field identifies the importance of an asset in protecting public health and the environment. Separate from regulatory requirements, this question is focused whether asset failure can be directly linked to potential public health or environmental issues. For example, a major water main break can result in low pressures in the system and a possible back flow or back siphonage of non-potable water into the system. For wastewater, a pump station failure could expose the public to raw sewage via a basement back up or system overflow.

1. Select the most appropriate response to the question "Could asset failure lead to a public health or environmental concern?" from the dropdown menu. Manual entry of values is not allowed because the response drives calculation of the CoF score.
    a. Responses: Yes, No, Unknown
2. Ensure that all assessors that complete the tool are consistent in their understanding of the potential public health and environmental issues that could arise from asset failure.

Note for Regulatory Compliance and Public Health and Environmental Concerns: These questions should be answered based on the system as it functions currently. For example, if there are redundant pumps or wells but the assessment is considering them each individually, the answer should consider the available "back-up" or redundant assets. Where there is redundancy or back-up, failure of a single pump or well

may not lead to regulatory or public health issues. However, if you want to develop a condition and vulnerability assessment for an asset group (e.g., wells or pumps collectively), enter a group of redundant assets as a separate row and answer these questions assuming all redundant assets in the group fail.

Consequence of Failure (CoF) Score = The CoF score provides an estimate of how problematic asset failure would be based on the response to the earlier questions about importance, regulatory compliance, and public health and environmental concerns. The responses to these questions are multiplied by a weighting factor. Then, all responses are added up to determine the score. The higher the score, the higher the consequence of failure. The highest possible score is 10.

Estimated Remaining Life = This field calculates whether a given asset is in the last one-third of its expected lifespan. The calculation is based on estimated useful life and remaining useful life data from the Asset Inventory worksheet. This calculation will account for changes in remaining useful life as the tool is updated over time (see description of Remaining Useful Life in the Asset Inventory section above).

1. This column is locked for editing. Manual values cannot be entered.

Capacity = This entry represents the stress put on an asset that could affect asset function or lifespan. Capacity refers to the asset's intended design capacity. Examples of assets operating beyond capacity include small diameter water lines that have more connections that originally intended, pumps that are operating more continuously than the manufacturer recommends, or treatment systems producing beyond design.

1. Select the most appropriate response to the question "Are you operating the asset beyond, at, or below intended capacity?" from the dropdown menu. Manual entry of values is not allowed because the response drives calculation of the PoF score.
   a. Responses: At capacity, Below capacity, Beyond capacity

Reliability = This field is automatically entered from the Condition Assessment sheet. See description in Condition Assessment section above

1. This column is locked for editing. Manual values cannot be entered.

Repair Schedule = This field indicates how asset condition is changing over time. Rate of repair can be defined for either routine maintenance, additional repairs, or both. This field is like the "Reliability" score on the Condition Assessment tab but should reflect more recent changes in an asset's repair schedule. Consider reviewing review repair logs to determine the answer to this question.

1. Select the best response to the question "Has the rate of repairs increased within the past 0-2 years?" from the dropdown menu. Manual entry of values is not allowed because the response drives calculation of the PoF score.
   a. Responses: Yes, No, Unknown

Probability of Failure (PoF) Score = The PoF score estimates the probability that an asset could fail based on responses to previous questions about estimated remaining life, capacity, reliability, and repair schedule. Responses are multiplied by a weighting factor and then all responses are added to determine

the PoF score. The higher the PoF score the greater the probability of failure. The highest possible score is 10.

Additional Resources
Asset Management for Your Water System
Fundamentals of Asset Management, Slide 15
Taking Stock of your Small Water System: A Simple Asset Inventory for Very Small Water Systems

Critical Assets

Overview
The Critical Assets sheet is the final output of the SCAP Tool. All cells in this sheet are locked for editing. Information from previous sheets is repeated in the Critical Assets sheet and used to calculate three things: Criticality Score, Combined Score, and Rank.

Figure 8. Screenshot of sheet "2c_Critical Assets." This sheet is the final output of the tool assessment.

Criticality Score = Each asset's criticality is defined by CoF, PoF, and redundancy. The formula used to calculate criticality is: *CoF*PoF*0.75* (for assets with redundancy) or *CoF*PoF* for assets without redundancy. The higher the score, the more critical the asset.

Combined Score = The asset's combined score is the sum of the criticality score and the condition assessment score. The higher the score, the more critical the asset.

Rank = This is an ordered rank that adjusts as assets are added and evaluated. The rank order is based on the Combined Score and can be used to prioritize assets based on their criticality. The highest score is the most critical asset in your system in terms of condition and vulnerability.

Additional Resources
Asset Management for Your Water System
Developing Asset Management Plans Using CUPSS
Asset Management: A Guide for Water and Wastewater Systems
Asset Management Manual: A.M. Kan Work! - Section 3 and Appendix A

Save Your Work

By completing this tool, you are putting a lot of effort into tracking and evaluating your assets. Be sure to save your data often as well as when you exit the tool! It would also be wise to keep a copy or back up of your work. A thumb drive or other means of backing up and protecting your data could prove to be invaluable.

You may also want to consider saving a version of the original file as a "master" to refer back to if needed.

Troubleshooting

Pop ups Blocking Data Entry

If a pop up or drop-down box is blocking your ability to enter data, the "Esc "key will make the box disappear.

Deleting an Asset

To remove an asset from the tool because it has been replaced or removed from service, unprotect the file and right click on the row number at the far left side of the Asset Inventory sheet. Then select "delete" and that row will be removed from this and subsequent sheets. This method is preferred over deleting data from the row and replacing it with a different asset data.

Inserting a New Row for an Additional Asset

If you add a row to the Asset Inventory Sheet in order to add a new asset, data below that row will seem to disappear from the subsequent sheets. The data is still available. Enter information for the required fields on the blank row in the Asset Inventory sheet and the data for assets below this row will show up again in the subsequent sheets.

Run-time Error

If you encounter a run-time error such as shown in the image below, it may be because a required field is not completed for a given asset. Select "End" and go back to the Asset Inventory page and ensure that the Asset Category, Asset Type, Estimated Useful Life, and Estimated Installation Date fields all have entries.