4 – Prioritizing assets

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Water and Pollution Control
Operators Association

Turning your data into useful information

- Once you have begun to accumulate data, the next step is to figure out how to store it to be useful and to turn it into information
- The most basic way to store information is on paper
  - Look at the document “System Inventory Worksheet.docx” on the course website
- Other methods of storing data and turning it into information include using a spreadsheet (most common) or customized database

Storing the data on paper – a good way to begin

- This example is the “System Inventory Worksheet.docx” on the course website
- Good way to begin to conceptualize your data
- There are some issues
  - Difficult to manipulate data
  - Very minimal sortability
  - Difficult to modify the worksheet to capture additional features

System Inventory Worksheet						
Date Worksheet Completed/Updated:					Page:	
Asset	Expected Useful Life	Condition	Service History	Age	Adjusted Useful Life	Remaining Useful Life

Storing the data on paper – a good way to begin

- A first step might be to begin the asset inventory on paper (or at least provide paper to field personnel to record assets)
- Then convert the data on paper to a spreadsheet

System Inventory Worksheet						
Date Worksheet Completed/Updated:					**Page:**	
Asset	**Expected Useful Life**	**Condition**	**Service History**	**Age**	**Adjusted Useful Life**	**Remaining Useful Life**
Line 23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft						
Tank 2 paint						
Well #1						
4" valve – southeast corner of New Light Road and Gray Road						
SCADA system						
40'x60' meeting and storage building						
2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22)						
Fire hydrants (4)						
Well #2 Chlorinator						
Well #1 pressure tank						

Utilizing a spreadsheet for the asset inventory

- A spreadsheet – even if you don't know a lot about using one – provides a simple method of entering data
- If the spreadsheet is set up "correctly", a form could be printed for manual data entry in the field
- A spreadsheet's layout can be changed and manipulated easily

System Inventory Worksheet				Date:		4/3/2025
Asset	Expected Useful Life	Condition	Service History	Age	Adjusted Useful Life	Remaining Useful Life
Line 23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft						
Tank 2 paint						
Well #1						
4" valve – southeast corner of New Light Road and Gray Road						
SCADA system						
40'x60' meeting and storage building						
2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22)						
Fire hydrants (4)						
Well #2 Chlorinator						
Well #1 pressure tank						

Manipulating a spreadsheet

- Spreadsheets can be easily manipulated and relatively easily sorted
- Print settings will need to be readjusted
- But specific columns and rows can be printed for informational purposes
- A spreadsheet can be imported into any type of database with ease

	A	B	C	D	E	F	G	H	I	J
1		System Inventory Worksheet						Date:		4/3/2025
2	System Category	Asset	Latitude	Longitude	Expected Useful Life	Condition	Service History	Age	Adjusted Useful Life	Remaining Useful Life
3	Dist	Line 23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft	33.430706	-88.801947						
4	Dist	4" valve – southeast corner of New Light Road and Gray Road	33.430101	-88.801904						
5	Dist	2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22)	33.430848	-88.801136						
6	Misc	40'x60' meeting and storage building	33.430391	-88.801149						
7	Safety	Fire hydrants (4)	33.430706	-88.801947						
8	Storage	Tank 2 paint	33.430295	-88.801917						
9	Storage	Well #1 pressure tank	33.430204	-88.801819						
10	Supply	Well #1	33.430204	-88.801819						
11	Treatment	SCADA system	33.430433	-88.801721						
12	Treatment	Well #2 Chlorinator	33.430295	-88.801917						

Criticality

- Criticality (a measure of how critical an asset is to the effective operation of the water system) is an important factor in prioritizing future asset projects
- Criticality is somewhat subjective, but scores can be assigned effectively based on the system goals and the operator
- A good rule of thumb is to assign scores of “1” to assets that are most critical and “5” to assets that are least critical (with gradients in the middle)

Criticality examples

Asset	Criticality Score	Rationale
Chlorinator	1	Disinfection
Fluoride feeder	5	System can run efficiently without fluoride
Maintenance building	3	Important for storage, but doesn't significantly affect performance
Valve	3	Useful in isolating leaks, but system can be shut down for leak repair
Distribution line	1	Can't get water to customers without distribution lines
Well	1	Can't get water for treatment without a well
Fire hydrant	2	Not necessary for system performance, but fulfills other roles
Pump	1	Can't get water for treatment without a pump
SCADA System	3	Operator can check and operate system without SCADA

Spreadsheet example

Attached is an example of a comprehensive asset listing with criticality

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1			System Inventory Worksheet									Date: 4/3/2025							
2	System Category	Asset Category	Asset	Line Segment	Length of Pipe (ft)	Latitude	Longitude	Expected Useful Life		Condition	Service History	Age		Adjusted Useful Life		Remaining Useful Life		Level of Service	Criticality
3								Length	Time Unit			Length	Time Unit	Length	Time Unit	Length	Time Unit		
4	Dist	1	Line P23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft	P-23	964	33.430706	-88.801947	35	years	Very leaky; pipe is deteriorating	Averages a leak every three months. Each leak takes 1½ hours to repair	20	years	25	years	5	years	1	1
5	Dist	1	2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22)	P-3, P-4, P-5, P-12, P-22	18,777	33.430848	-88.801136	35	years	Good condition, but area is gaining population; new customers can't be serviced – need replacing	Normal maintenance and service	15	years	20	years	5	years	2	1
6	Storage	6	Well #1 pressure tank		1	33.430204	-88.801819	35	years	Fair condition; needs painting/reconditioning	Inspected regularly as of late	45	years	45	years	8	years	2	1
7	Treatment	7	Well #1 Chlorinator		1	33.541316	-88.741357	15	years	Good condition	Serviced regularly	4	years	12	years	8	years	4	1
8	Dist	1	Line P-8 - 2.00" line on Adation-Longview Road S	P-8	1,589	33.000380	-88.352218	40	years	Should be upgraded to 4" line	Not adequate for future growth on western end of system	25	years	35	years	10	years	2	1
9	Dist	1	Line P-9 - 2.00" line on Sykes Road	P-9	1,763	33.768969	-88.978564	40	years	Should be upgraded to 4" line	Not adequate for future growth on western end of system	25	years	35	years	10	years	2	1
10	Dist	1	Line P-31 - 2.00" line on Sykes Road	P-31	201	33.322451	-88.220131	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1
11	Dist	1	Line P-32 - 2.00" line on Sykes Road	P-32	2,432	33.705658	-88.070302	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1

See 4 – Criticality in Comprehensive Asset Management Spreadsheet

Prioritization

- Prioritization is simply the order in which you should address the refurbishment/replacement of the assets in your system
- If the criticality scheme explained earlier is used, then a ***draft*** prioritization can be found by simply multiplying the remaining useful life by the criticality score
  - Lower prioritization scores mean that the condition of the asset should be addressed relatively soon
  - Higher prioritization scores suggest that action for the asset can be delayed for a period of time
- Once prioritization scores are calculated, asset actions can be ranked and priorities established

Spreadsheet example

Attached is an example of a comprehensive asset listing with prioritization in the listing's original order

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1			System Inventory Worksheet									Date: 4/3/2025								
2	System Category	Asset Category	Asset	Line Segment	Length of Pipe (ft)	Latitude	Longitude	Expected Useful Life		Condition	Service History	Age		Adjusted Useful Life		Remaining Useful Life		Level of Service	Criticality	Prioritization Score
3								Length	Time Unit			Length	Time Unit	Length	Time Unit	Length	Time Unit			
4	Dist	1	Line P23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft	P-23	964	33.430706	-88.801947	35	years	Very leaky; pipe is deteriorating	Averages a leak every three months. Each leak takes 1½ hours to repair	20	years	25	years	5	years	1	1	5
5	Dist	1	2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22)	P-3, P-4, P-5, P-12, P-22	18,777	33.430848	-88.801136	35	years	Good condition, but area is gaining population; new customers can't be serviced – need replacing	Normal maintenance and service	15	years	20	years	5	years	2	1	10
6	Storage	6	Well #1 pressure tank		1	33.430204	-88.801819	35	years	Fair condition; needs painting/reconditioning	Inspected regularly as of late	45	years	45	years	8	years	2	1	16
7	Treatment	7	Well #1 Chlorinator		1	33.541316	-88.741357	15	years	Good condition	Serviced regularly	4	years	12	years	8	years	4	1	32
8	Dist	1	Line P-8 - 2.00" line on Adation-Longview Road S	P-8	1,589	33.000380	-88.352218	40	years	Should be upgraded to 4" line	Not adequate for future growth on western end of system	25	years	35	years	10	years	2	1	20
9	Dist	1	Line P-9 - 2.00" line on Sykes Road	P-9	1,763	33.768969	-88.978564	40	years	Should be upgraded to 4" line	Not adequate for future growth on western end of system	25	years	35	years	10	years	2	1	20
10	Dist	1	Line P-31 - 2.00" line on Sykes Road	P-31	201	33.322451	-88.220131	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1	20
11	Dist	1	Line P-32 - 2.00" line on Sykes Road	P-32	2,432	33.705658	-88.070302	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1	20
12	Dist	1	Line P-36 - 2.00" line on New Hope Church Road	P-36	1,021	33.624271	-88.228667	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1	20

See 4 – Asset Prioritization in Comprehensive Asset Management Spreadsheet

Spreadsheet example

- The beauty of the spreadsheet is that the assets can be sorted in any way that is helpful to the analysis
  - The lines shown are the top priorities for asset refurbishment/replacement

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1			System Inventory Worksheet									Date: 4/3/2025								
2	System Category	Asset Category	Asset	Line Segment	Length of Pipe (ft)	Latitude	Longitude	Expected Useful Life		Condition	Service History	Age		Adjusted Useful Life		Remaining Useful Life		Level of Service	Criticality	Prioritization Score
3								Length	Time Unit			Length	Time Unit	Length	Time Unit	Length	Time Unit			
4	Dist	1	Line P23 – 2" line on west side Longview-Adaton Road heading to Morris Road – 964 ft	P-23	964	33.430706	-88.801947	35	years	Very leaky; pipe is deteriorating	Averages a leak every three months. Each leak takes 1½ hours to repair	20	years	25	years	5	years	1	1	5
5	Dist	1	2" and 2½" lines on Gray Road and past Gray Road on New Light Road (18,777 feet; P-3, P-4, P-5, P-12, P-22)	P-3, P-4, P-5, P-12, P-22	18,777	33.430848	-88.801136	35	years	Good condition, but area is gaining population; new customers can't be serviced – need replacing	Normal maintenance and service	15	years	20	years	5	years	2	1	10
6	Storage	6	Well #1 pressure tank		1	33.430204	-88.801819	35	years	Fair condition; needs painting/reconditioning	Inspected regularly as of late	45	years	45	years	8	years	2	1	16
7	Treatment	7	Well #1 Chlorinator		1	33.541316	-88.741357	15	years	Good condition	Serviced regularly	4	years	12	years	8	years	4	1	32
8	Dist	1	Line P-8 - 2.00" line on Adation-Longview Road S	P-8	1,589	33.000380	-88.352218	40	years	Should be upgraded to 4" line	Not adequate for future growth on western end of system	25	years	35	years	10	years	2	1	20
9	Dist	1	Line P-9 - 2.00" line on Sykes Road	P-9	1,763	33.768969	-88.978564	40	years	Should be upgraded to 4" line	Not adequate for future growth on western end of system	25	years	35	years	10	years	2	1	20
10	Dist	1	Line P-31 - 2.00" line on Sykes Road	P-31	201	33.322451	-88.220131	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1	20
11	Dist	1	Line P-32 - 2.00" line on Sykes Road	P-32	2,432	33.705658	-88.070302	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1	20
12	Dist	1	Line P-36 - 2.00" line on New Hope Church Road	P-36	1,021	33.624271	-88.228667	40	years	Should be upgraded to 4" line	Not adequate for future growth	25	years	35	years	10	years	2	1	20

Things to remember

- Prioritization scores are a guide to assist the system in prioritizing asset refurbishment/replacement
- DO NOT view this as an absolute mandate regarding the assets that you should address first
- At the same time, if you put forth an honest effort in developing these scores, they should not be totally ignored
- Factors affecting the final prioritization include knowledge of the asset that might not be included in the inventory, unforeseen circumstances, unexpected growth or declines in populations, etc.

Database programs/platforms to store and manipulate data

- There are a number of other specialized (to some extent) programs to store and manipulate data
- CUP$$ - a relatively comprehensive asset management database developed by EPA. Doesn't seem to be supported any longer, but files can still be accessed. Relatively cumbersome.
- Access, OpenOffice Base, SQLite, Google Sheets - database programs that can be customized to fit your situation. Learning curve is usually pretty steep. Also, entering data is easier than obtaining information
- Hire or contract with an IT professional that can integrate an asset management system with GIS, human resources, etc. This is expensive and make sure that the person gets what you need instead of what s/he wants to provide you

References

- International Standards Organization. “Activities relating to drinking water and wastewater services – Guidelines for the assessment and for the improvement of the service to users.” 2024. https://cdn.standards.iteh.ai/samples/81484/e6b883a5f069462fa5c8748a5731b2de/ISO-24510-2024.pdf
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