

WATER AUDITS AS THE FIRST PART OF WATER LOSS CONTROL

Presented by: Dawn Nall
Southwest Environmental Finance Center



When you know better you do better

Maya Angelou

**Remember to
type in
questions at any
time as we go
along**

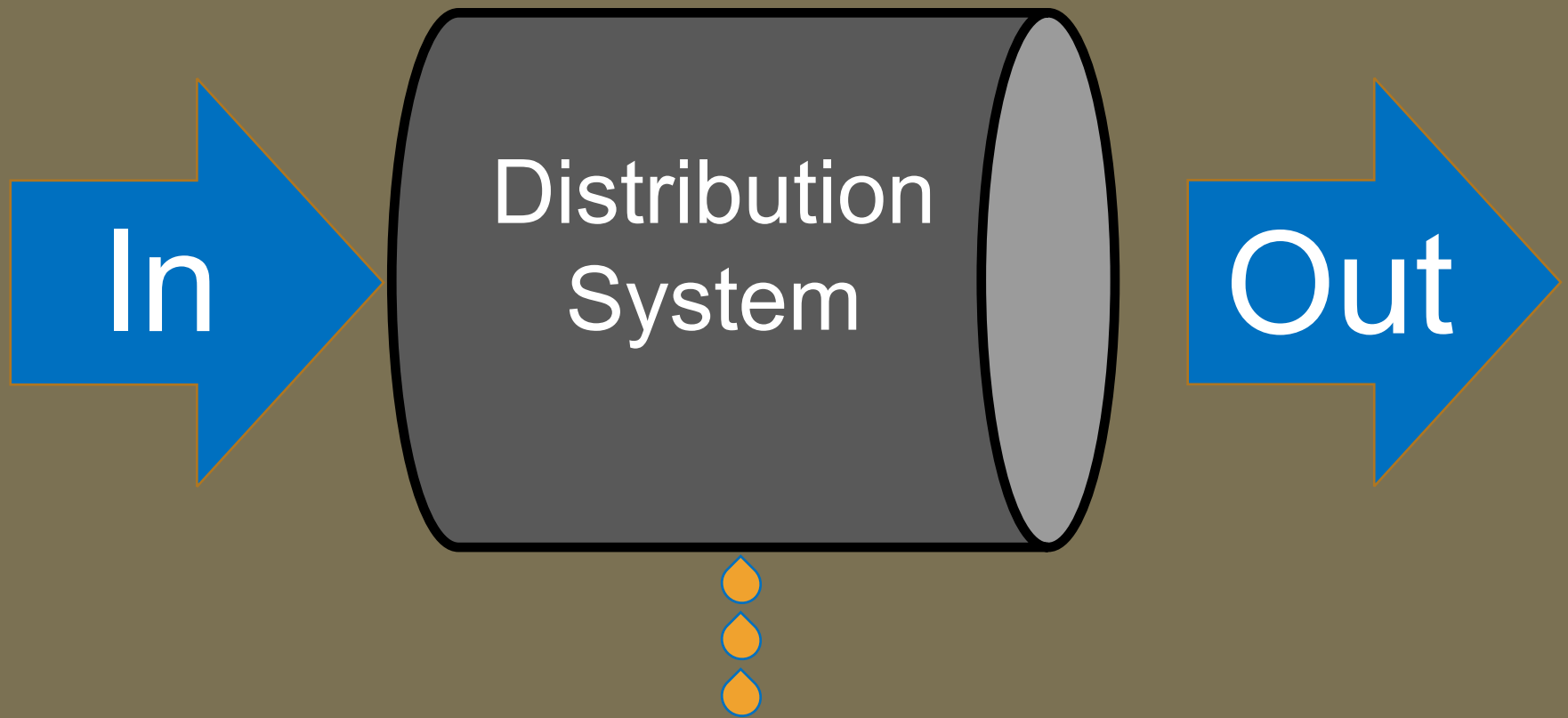


Understanding The Water Balance as a Blue and a Green Problem



What goes
in,

comes out ... somewhere



You are getting paid...



=



Or you are not...

So it's a blue and green problem ...

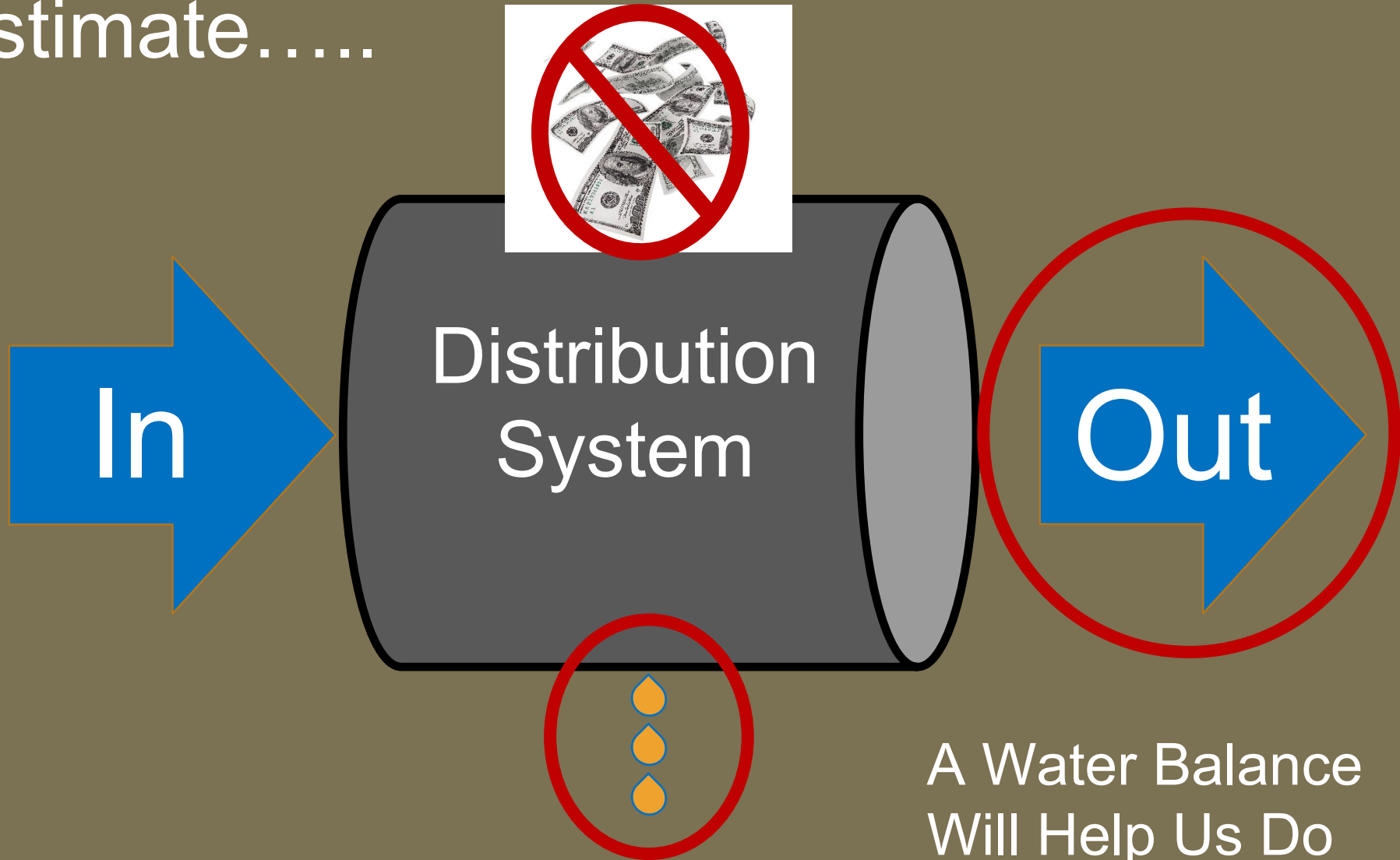


Water that isn't going
out where we want



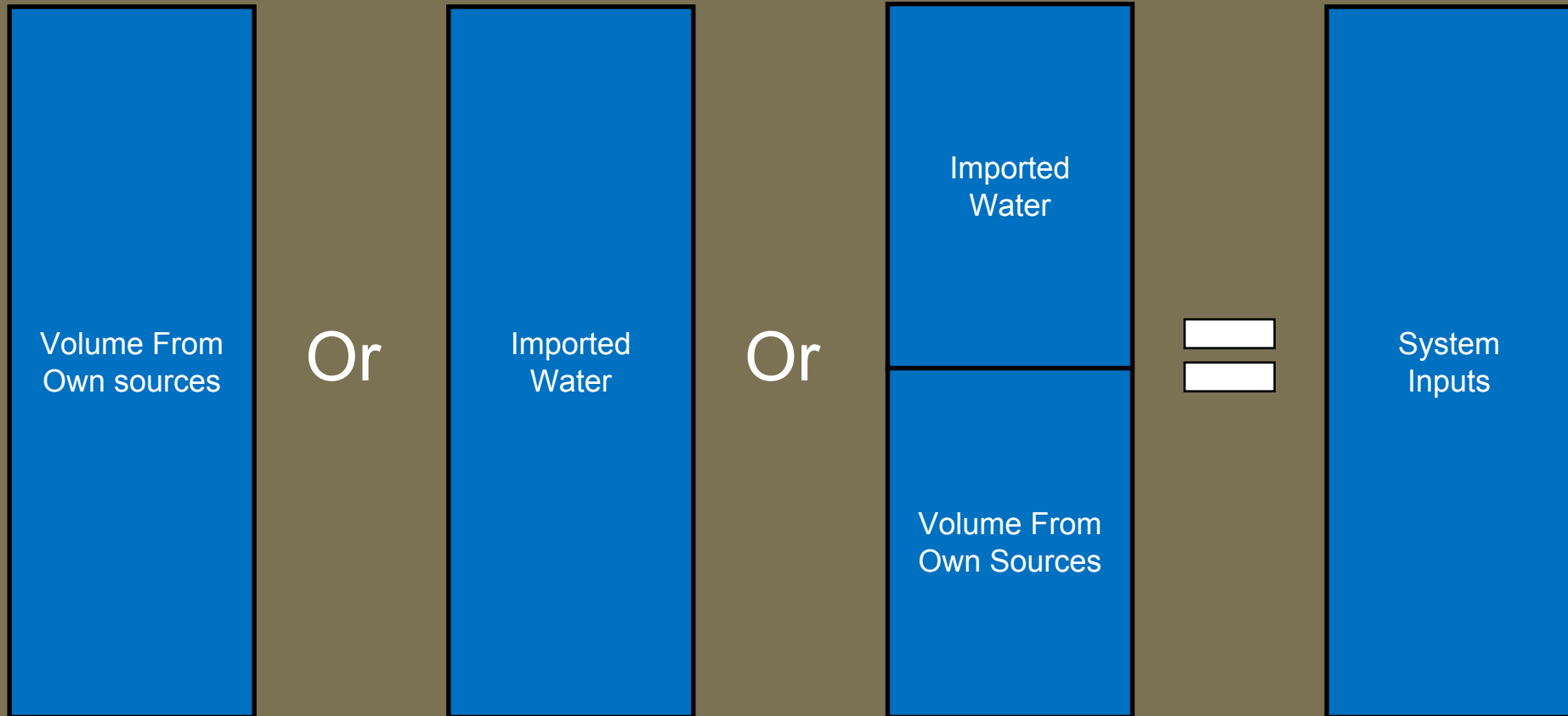
Money that we're not
getting, but could be

We need a way to help us estimate.....

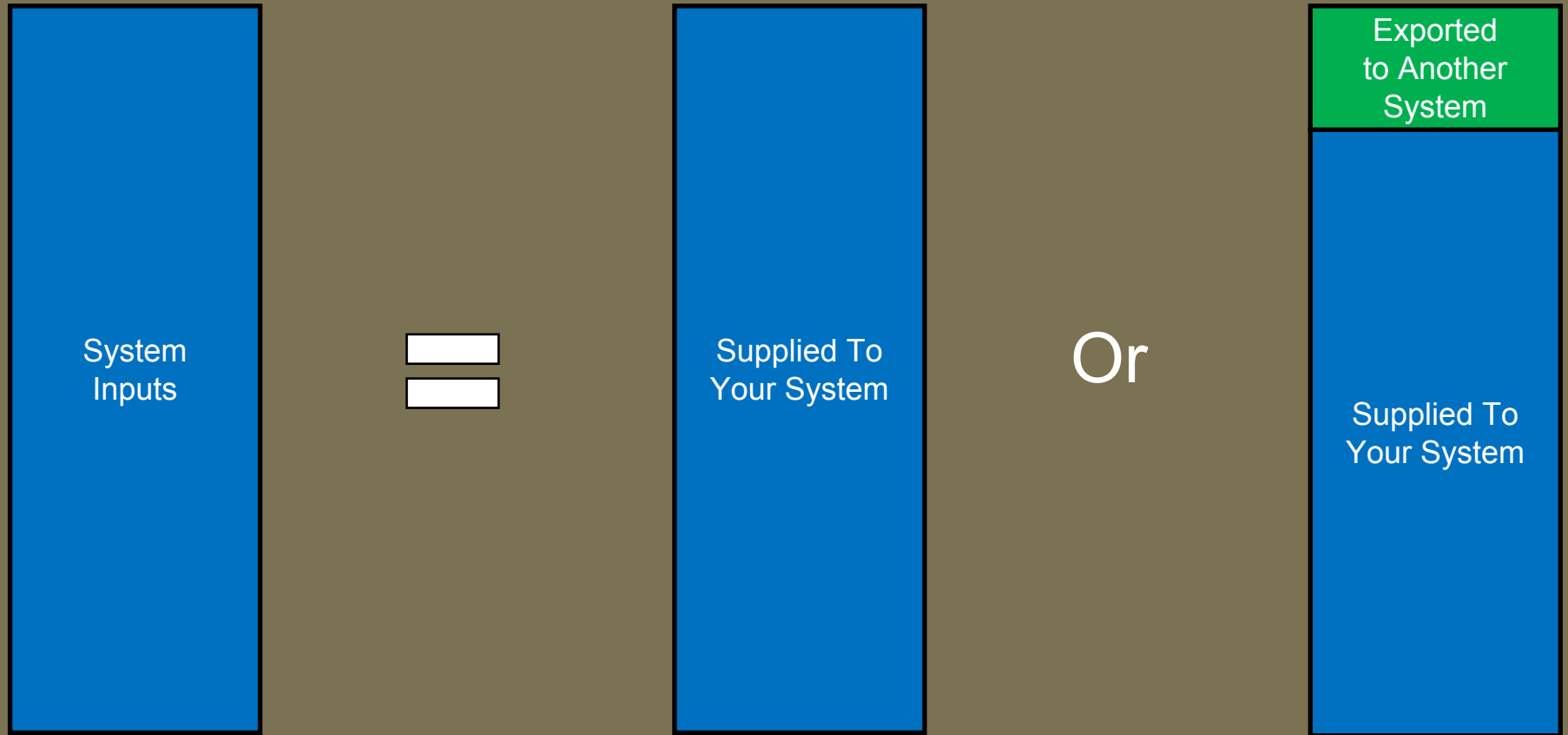


A Water Balance
Will Help Us Do
This

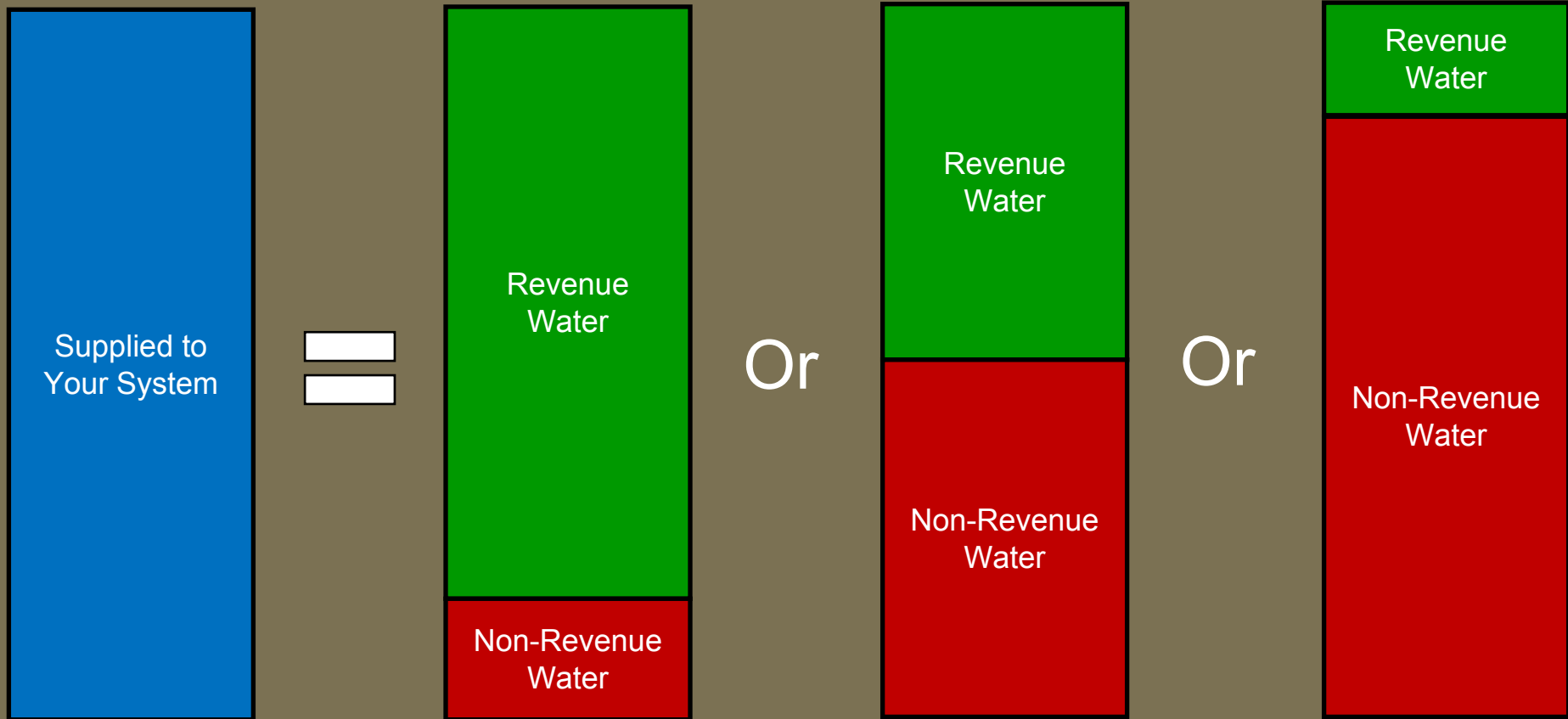
The Water Balance: System Inputs



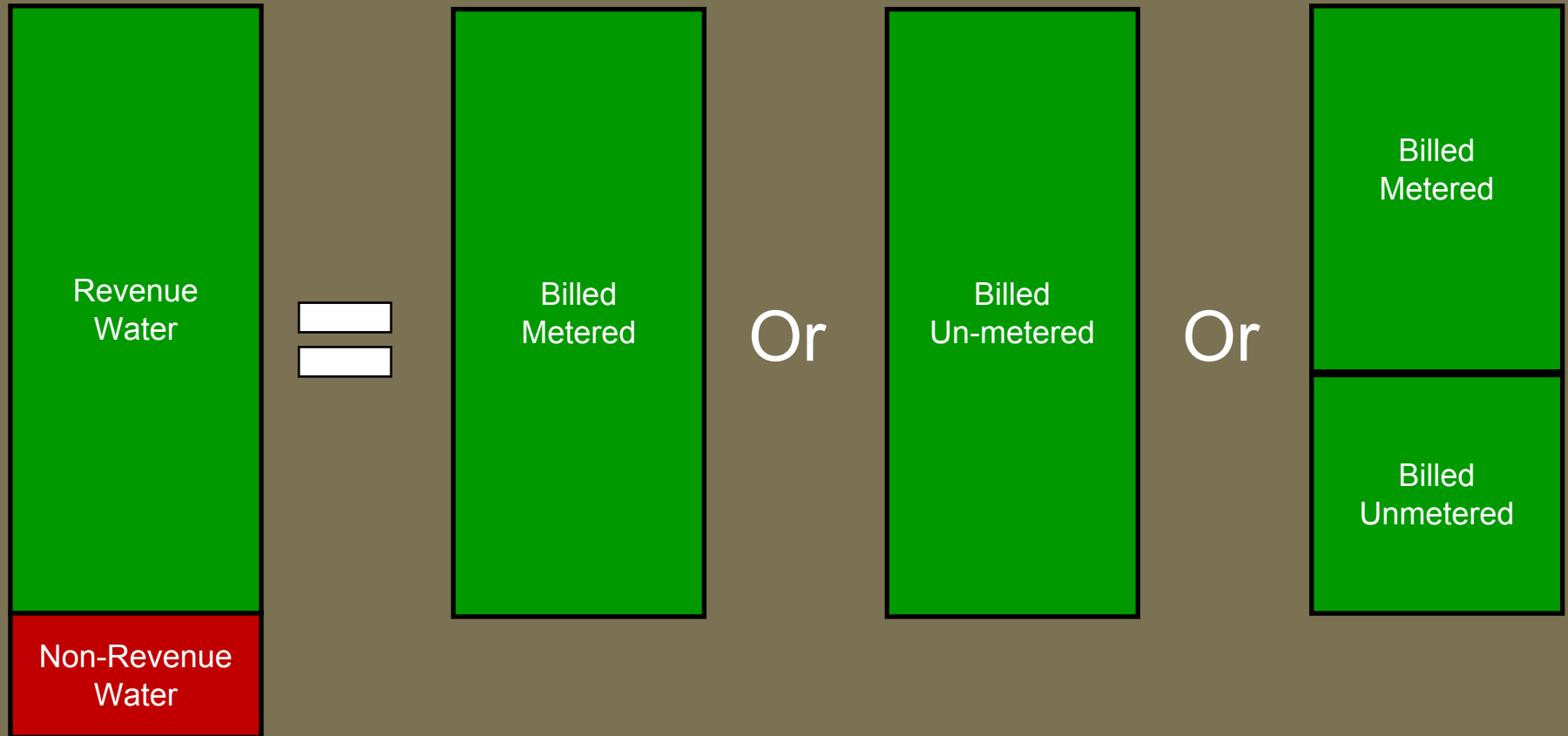
The Water Balance:



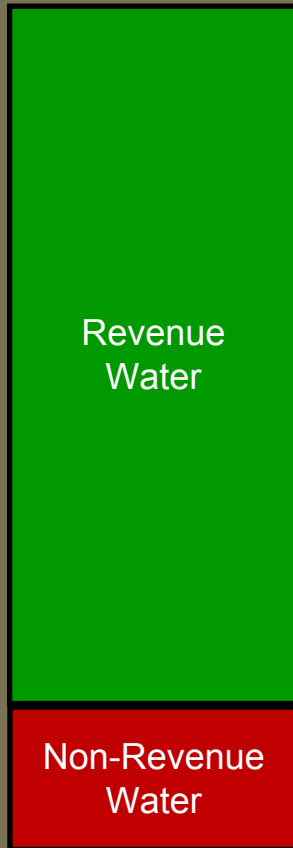
Water either generates revenue or not ...



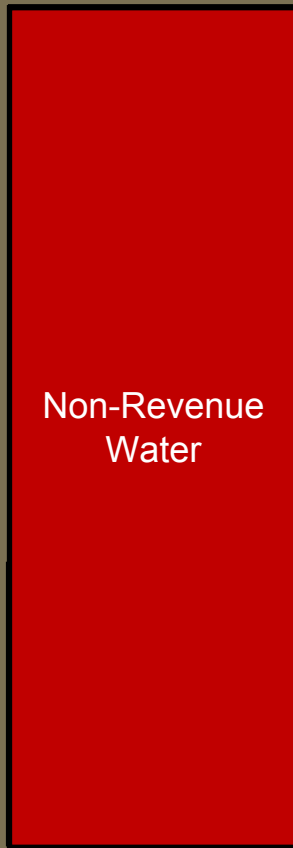
Revenue Water... Billed & Authorized



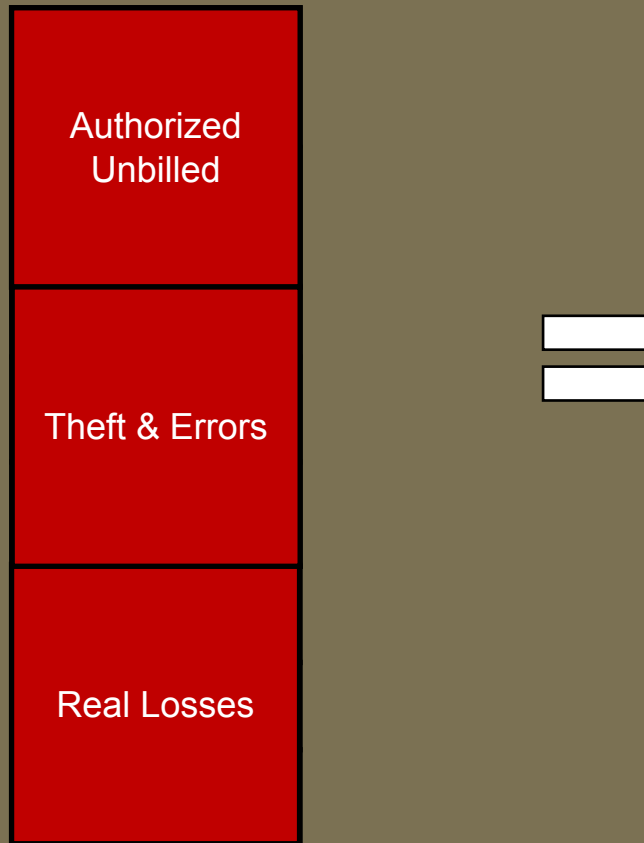
Let's focus on Non-Revenue Water



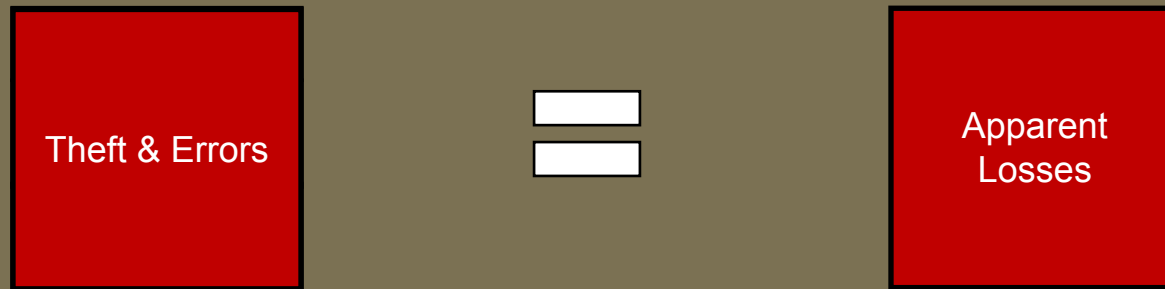
Non-revenue water... has 3 main components



Each of these can be broken down further ...



A bit about terminology ...

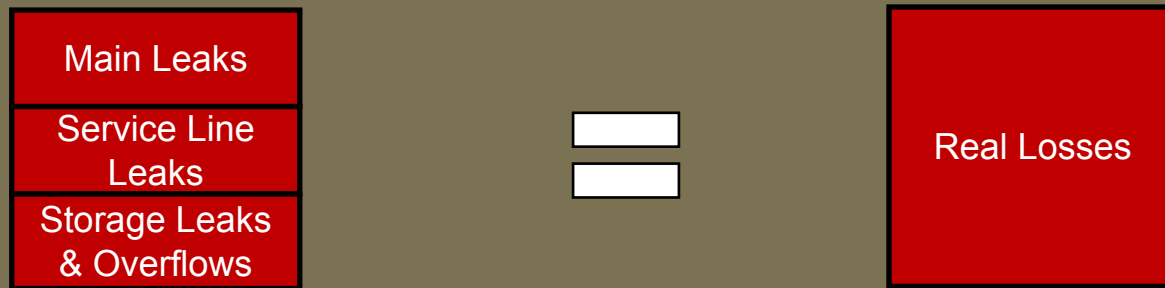


NOT PHYSICAL LOSSES

- Water reaches a user
- Volumes are not counted
- Water does not generate revenue

VALUED AT THE PRICE YOU CHARGE CUSTOMERS

A bit more about terminology....



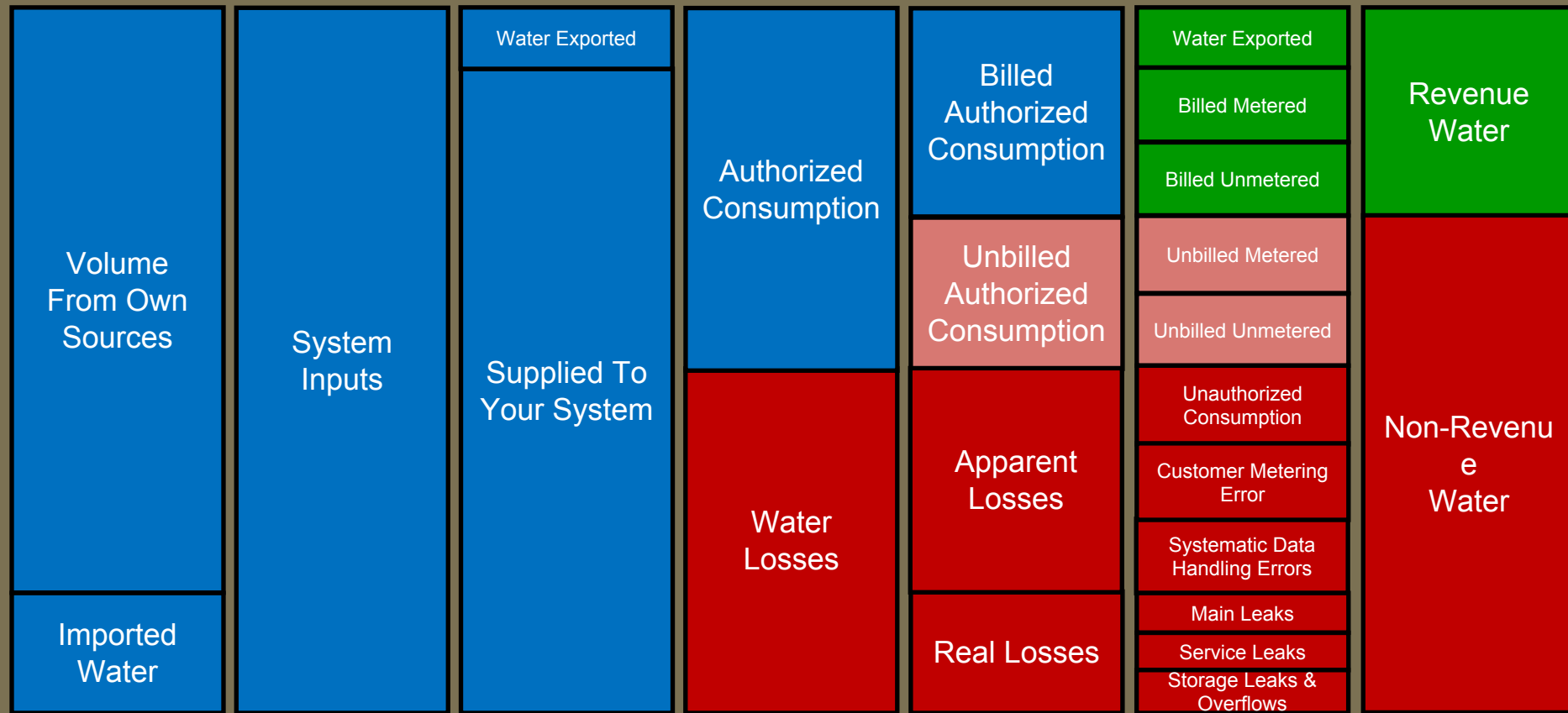
ARE PHYSICAL LOSSES

- Water did not reach a customer
- Difficult if not impossible to measure
- Water does not generate revenue

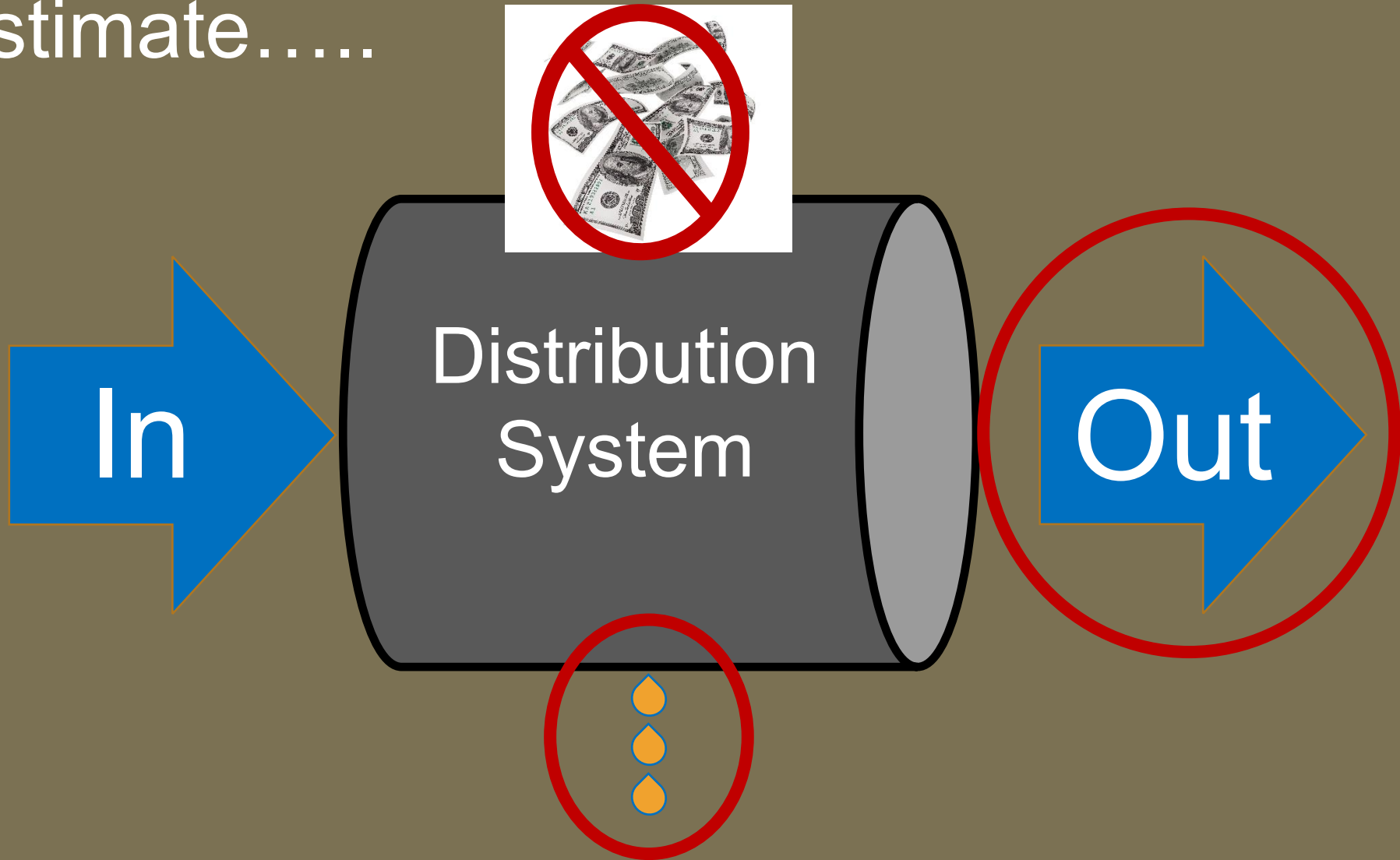
VALUED AT THE PRICE OF PRODUCTION

You CAN'T directly charge for losses, but all customers pay indirectly

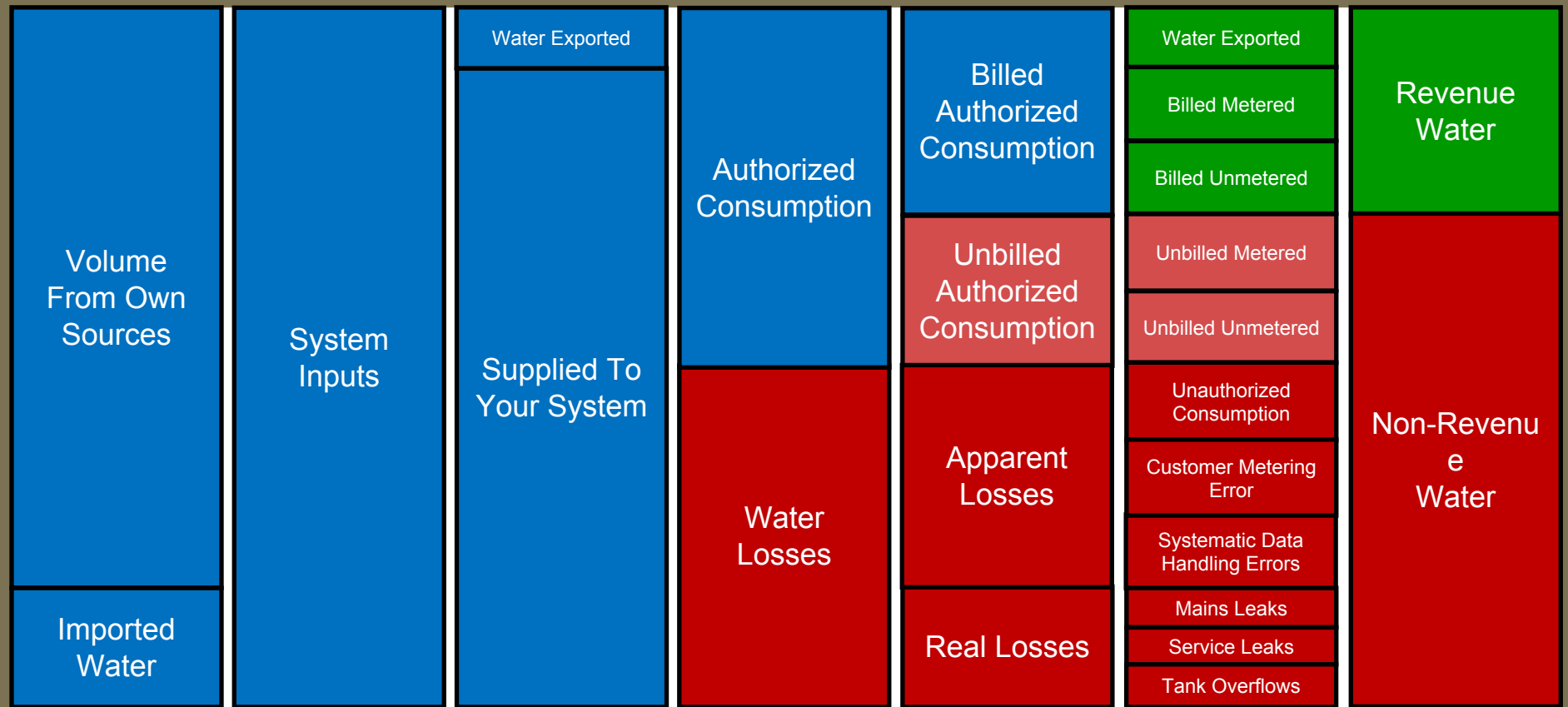
Let's put it together... in a slightly different order



We want a water balance to help us estimate.....



One option would be to use the water balance to figure out directly what the flows in each category are, but...



There's An Easier Way Using the AWWA Water Audit Software Tool



Industry Standard
(M36)

Free

Defaults provided

awwa.org/waterlosscontrol

AWWA Free Water Audit Software: Reporting Worksheet

Water Audit Report for: Northern San Leandro Combined Water Sewer Storm Utility District (0007900)
Reporting Year: 2013 1/2013 - 12/2013

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED

Volume from own sources: 5 1,000,000 MG/yr
Water imported: 1 100,000 MG/yr
Water exported: 1 100,000 MG/yr

WATER SUPPLIED: 825,000 MG/yr

Master Meter Error Adjustments

Pent	Value	MG/yr
1	100,000	MG/yr
9	25,000	MG/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: 8 700,000 MG/yr
Billed unmetered: 9 50,000 MG/yr
Unbilled metered: 10 10,313 MG/yr
Unbilled unmetered: 11 10,313 MG/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 760,313 MG/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 64,688 MG/yr

Apparent Losses

Unauthorized consumption: 10 3,000 MG/yr
Customer metering inaccuracies: 5 7,071 MG/yr
Systematic data handling errors: 4 5,000 MG/yr

Apparent Losses: 15,071 MG/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 49,617 MG/yr

WATER LOSSES: 64,688 MG/yr

NON-REVENUE WATER

NON-REVENUE WATER: 75,000 MG/yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: 7 100.0 miles
Number of active AND inactive service connections: 6 1,000
Service connection density: 10 10 conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: 6 60.0 psi

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

COST DATA

Total annual cost of operating water system: 5 \$1,000,000 \$/year
Customer retail unit cost (applied to Apparent Losses): 7 \$3.50 \$/1000 gallons (US)
Variable production cost (applied to Real Losses): 7 \$3,000.00 \$/Million gallons

AWWA Provides
Software To Make



**NOT AS BAD AS IT LOOKS. WHITE BOXES
INPUTS, YELLOW CALCULATED, SOME
ITEMS WON'T APPLY, OTHERS HAVE
DEFAULTS**

**AS AN ADDED BENEFIT YOU CAN LEARN A
LOT ABOUT YOUR SYSTEM BY DOING THE
AUDIT**

Volume Inputs
~70 System Data Inputs

awwa.org/waterlosscontrol

Setting The Parameters For the Audit

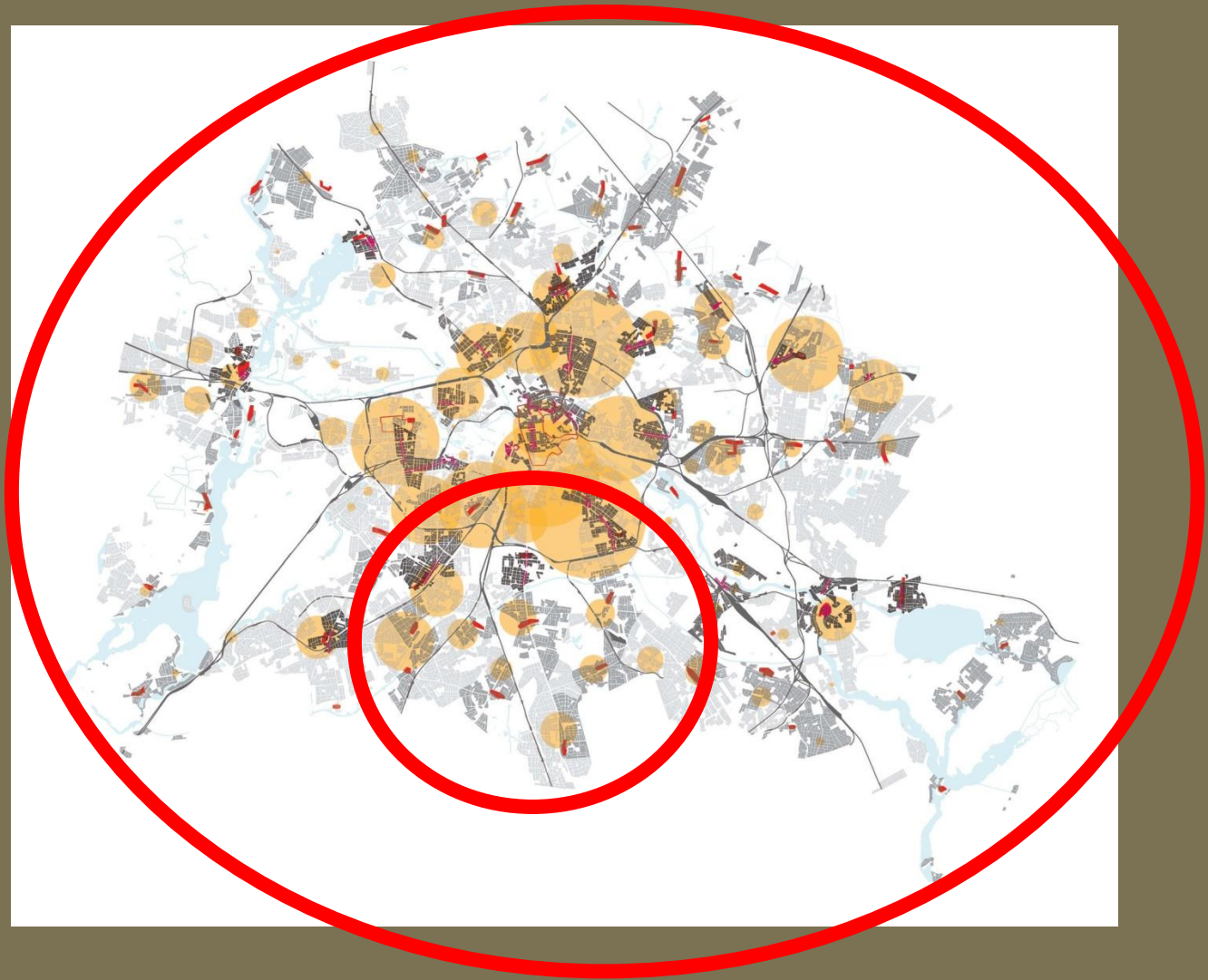


When you know better you do better

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What Area Does the Audit Entail?

ESTABLISH
BOUNDARIES
FOR THE
AUDIT



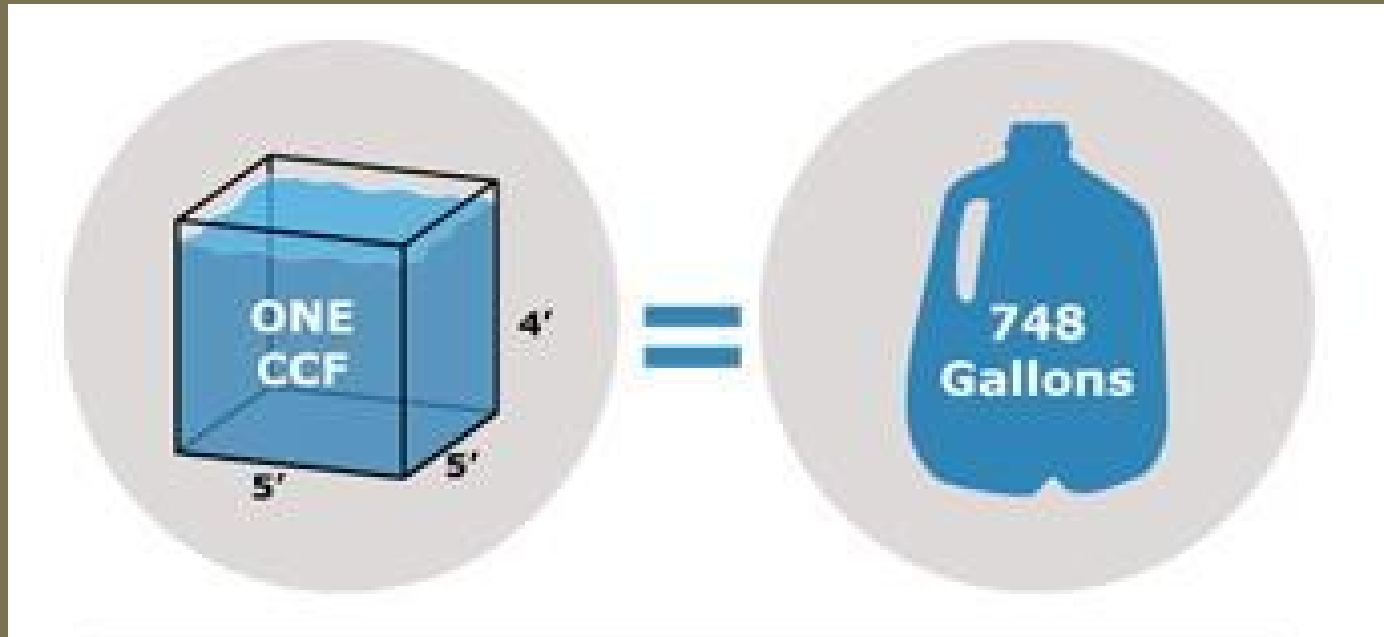
Set Time Period: AWWA Audit is Annual

Can be
Calendar
Year or
Fiscal
Year



Units of Measure

MG,
Megaliters,
Acre Feet

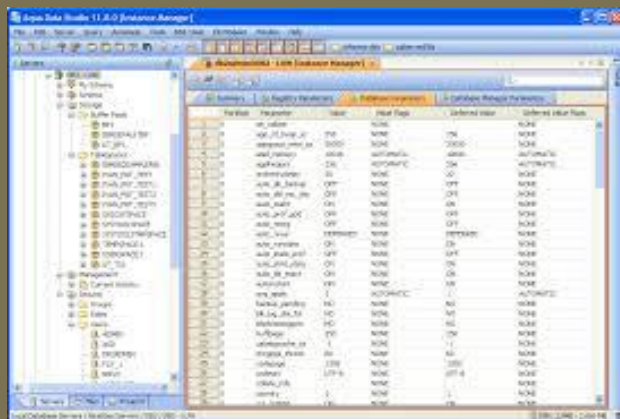


UNITS HAVE TO BE CONSISTENT ACROSS THE AUDIT

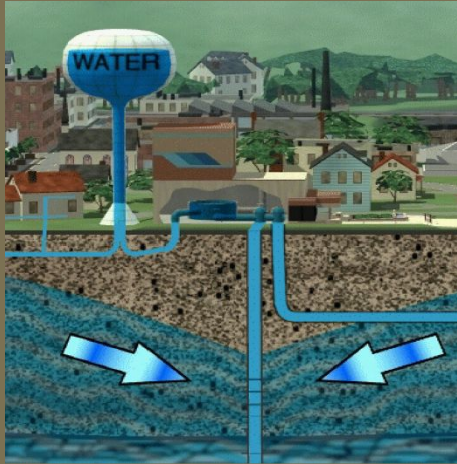
Next Step



ASSEMBLE RECORDS AND DATA



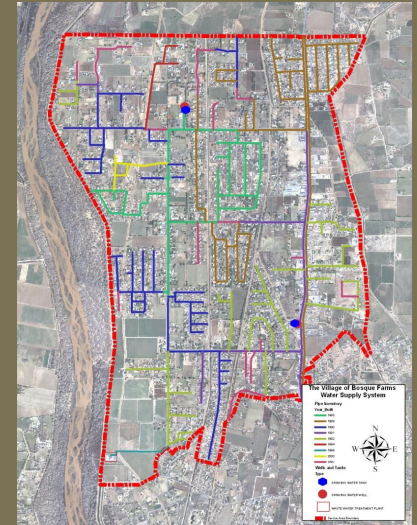
DATA FITS INTO 5 CATEGORIES



Water Supplied



Water Delivered
to Customers



System
Characteristics



Financial
Information



Other
Information

Important Considerations with Water Audit Data

Your data was not generated for the purpose of water auditing; It may be great for the purpose intended, but not always great for water auditing

Over time, you can change how you collect data to relate it to your water auditing needs

There will be anomalies/issues/inaccuracies/concerns with the data; These can be addressed before entering in the software or over time

How do you
collect your
data?

by hand
electronically




Where do you
store your data?

**YOU HAVE TO START
SOMEWHERE AND
DO WHAT YOU CAN.**

I don't have any good data
regarding what is going on in
my system. Can I really do
a water audit?

Let's Look Closer At How the Water Audit Software Works

AWWA Free Water Audit Software: Reporting Worksheet



Water Audit Report for: Northern San Leandro Combined Water Sewer Storm Utility District (0007900)
 Reporting Year: 2013 1/2013 - 12/2013

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED

		<----- Enter grading in column 'E' and 'U' ----->			
Volume from own sources:	<input type="text" value="5"/>	<input type="text" value="1,000.000"/>	MG/Yr		
Water imported:	<input type="text" value=""/>	<input type="text" value=""/>	MG/Yr		
Water exported:	<input type="text" value="1"/>	<input type="text" value="100.000"/>	MG/Yr		
WATER SUPPLIED:		825.000 MG/Yr			

AUTHORIZED CONSUMPTION

Billed metered:	<input type="text" value="8"/>	<input type="text" value="700.000"/>	MG/Yr		
Billed unmetered:	<input type="text" value="9"/>	<input type="text" value="50.000"/>	MG/Yr		
Unbilled metered:	<input type="text" value=""/>	<input type="text" value=""/>	MG/Yr		
Unbilled unmetered:	<input type="text" value=""/>	<input type="text" value="10.313"/>	MG/Yr		
Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed					
AUTHORIZED CONSUMPTION:		760.313 MG/Yr			

WATER LOSSES (Water Supplied - Authorized Consumption)

64.688 MG/Yr

Apparent Losses

Unauthorized consumption:	<input type="text" value="10"/>	<input type="text" value="3.000"/>	MG/Yr		
Unauthorized consumption volume entered is greater than the recommended default value					
Customer metering inaccuracies:	<input type="text" value="5"/>	<input type="text" value="7.071"/>	MG/Yr		
Systematic data handling errors:	<input type="text" value="4"/>	<input type="text" value="5.000"/>	MG/Yr		
Apparent Losses:		15.071 MG/Yr			

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	<input type="text" value=""/>	<input type="text" value="49.617"/>	MG/Yr		
WATER LOSSES:		64.688 MG/Yr			

Master Meter Error Adjustments

Pent:	<input type="text" value="1"/>	<input type="text" value="100.000"/>	MG/Yr
	<input type="text" value="9"/>	<input type="text" value="25.000"/>	MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Pent:	<input type="text" value="1.25%"/>	<input type="text" value=""/>	MG/Yr
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Pent:	<input type="text" value="1.00%"/>	<input type="text" value="5.000"/>	MG/Yr
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NON-REVENUE WATER

NON-REVENUE WATER:

75.000 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	<input type="text" value="7"/>	<input type="text" value="100.0"/>	miles
Number of active AND inactive service connections:	<input type="text" value="6"/>	<input type="text" value="1,000"/>	
Service connection density:	<input type="text" value=""/>	<input type="text" value="10"/>	conn./mile main

Are customer meters typically located at the curbside or property line? Yes

Average length of customer service line:

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: psi

COST DATA

Total annual cost of operating water system:	<input type="text" value="5"/>	<input type="text" value="\$1,000.000"/>	\$/Year
Customer retail unit cost (applied to Apparent Losses):	<input type="text" value="7"/>	<input type="text" value="\$3.50"/>	\$/1000 gallons (US)
Variable production cost (applied to Real Losses):	<input type="text" value="7"/>	<input type="text" value="\$3,000.00"/>	\$/Million gallons

Beginning the Water Audit

AWWA Free Water Audit Software v5.0

American Water Works Association Copyright © 2014, All Rights Reserved.

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

below.

Please begin by providing the following information

Name of Contact Person:

Email Address:

Telephone | Ext.:

Name of City / Utility:

City/Town/Municipality:

State / Province:

Country:

Year:

Start Date: Enter MM/YYYY numeric format

End Date: Enter MM/YYYY numeric format

Audit Preparation Date:

Volume Reporting Units:

PWSID / Other ID:

The following guidance will help you complete the Audit

All audit data are entered on the [Reporting Worksheet](#)

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: ☐ 0.25% ☒

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

 Choose the *Instructions* sheet as the starting point

Beginning the Water Audit

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Name of City / Utility:

City/Town/Municipality:

State / Province:

Country:

Year:

Start Date: Enter MM/YYYY numeric format

End Date: Enter MM/YYYY numeric format

Audit Preparation Date:

Volume Reporting Units:

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- These cells contain recommended default values

Use of Option (Radio) Buttons:

Pcnt: ☐ 0.25% ☒

Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connect

Enter contact information & system information

Beginning the Water Audit

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below.

Please begin by providing the following information

Name of Contact Person:

Email Address:

Telephone | Ext.:

Name of City / Utility:

City/Town/Municipality:

State / Province:

Country:

Year:

Start Date: Enter M / J / YYYY numeric format

End Date: Enter M / J / YYYY numeric format

Audit Preparation Date:

Volume Reporting Units:

PWSID / Other ID:

The following guidance will help you complete the Audit

All audit data are entered on the [Reporting Worksheet](#)

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: ☒ ☐

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connect

Choose calendar year (Jan 1 to Dec 31) or fiscal year. With fiscal year, you choose start and end date

Beginning the Water Audit

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Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

below.

Please begin by providing the following information

Name of Contact Person:

Email Address:

Telephone | Ext.:

Name of City / Utility:

City/Town/Municipality:

State / Province:

Country:

Year:

Start Date: Enter MM/YYYY numeric format

End Date: Enter MM/YYYY numeric format

Volume Reporting Units:

PWSID / Other ID:

The following guidance will help you complete the Audit

All audit data are entered on the [Reporting Worksheet](#)

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: ☐ 0.25% ☒

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connect

Choose volume reporting units: million gallons, megaliters, or acre feet. All data will be in the same unit

Beginning the Water Audit

AWWA Free Water Audit Software v5.0

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This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improvement, efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit for

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels.

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information:

Name of Contact Person:	Joe Waterman	
Email Address:	joe.waterman@waterworld.org	
Telephone - Ext:	555-555-1212	
Name of City / Utility:	Waterworld Water Utility	
City/Town/Municipality:	Greensville	
State / Province:	New Mexico (NM)	
Country:	USA	
Year:	2016	Calendar Year
Audit Preparation Date:	3/23/2017	
Volume Reporting Units:	Million gallons (US)	
FWAID / Other ID:	xxx333xxx	

The following guidance will help you complete the Audit:

All audit data are entered on the [Reporting Worksheet](#)

	Value can be entered by user
	Value calculated based on input data
	These cells contain recommended default

Use of Option (Radio) Buttons:

Item	Value
0.20%	

Select the default percentage by choosing the option button on the left

To enter a value, click this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page:

Completed Instructions Page

AWWA Free Water Audit Software: Reporting Worksheet WAS v5.0
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Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Enter grading in column 'E' and 'J' → Master Meter and Supply Error Adjustments

WATER SUPPLIED

Volume from own sources: MG/Yr
Water imported: MG/Yr
Water exported: MG/Yr

WATER SUPPLIED: **0.000** MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr
Unbilled unmetered: **0.000** MG/Yr

Enter a positive value, otherwise a default percentage of 1.25% (of billed metered) is applied and a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: **0.000** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) **0.000** MG/Yr

Apparent Losses

Unauthorized consumption: **0.000** MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: **0.000** MG/Yr
Systematic data handling errors: **0.000** MG/Yr

Apparent Losses: **0.000** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **0.000** MG/Yr

WATER LOSSES: **0.000** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **0.000** MG/Yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: miles
Number of active AND inactive service connections:
Service connection density: conn./mile main

Are customer meters typically located at the curbside or property line?
Average length of customer service line: ft (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average operating pressure: psi

COST DATA

Total annual cost of operating water system: \$/Year
Customer retail unit cost (applied to Apparent Losses):
Variable production cost (applied to Real Losses): \$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

PRIORITY AREAS FOR ATTENTION:
Based on the information provided, audit accuracy can be improved by addressing the following components:

NEXT STEP: DEVELOP INPUTS

STARTING POINT: WATER SUPPLIED

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

Volume from own sources: MG/Yr
Water imported: MG/Yr
Water exported: MG/Yr

Master Meter and Supply Error Adjustments

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 0.000 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr

Click here: ? for help using option buttons below

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

The volumes from own sources, water imported, and water exported in millions of gallons for the entire year will be entered here.

NEXT: NEED TO LOOK AT METER ERRORS

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J'

WATER SUPPLIED

Volume from own sources: MG/Yr
Water imported: MG/Yr
Water exported: MG/Yr

WATER SUPPLIED: 0.000 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr

Click here: ? for help using option buttons below

Pcnt: Value:

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

Enter the master meter(s) error(s) in percent error or millions of gallons; use flow weighted average
Negative value if meter under-registers, positive value if it over-registers

USING METER ERRORS

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association
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Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** 1/2016 - 12/2016

Metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

For each input, determine the highest grade where all criteria for that grade and all grades below it.

Enter grading in column 'E' and 'J' ----->


	Enter grading in column 'E' and 'J' ----->	Unit	Value:	
Own sources:	16.897	MG/Yr	-5.05%	MG/Yr
Water imported:		MG/Yr		MG/Yr
Water exported:		MG/Yr		MG/Yr
WATER SUPPLIED:	17.795	MG/Yr		

Enter negative % or value for under-registration
Enter positive % or value for over-registration

*Note the Increase in
Water Supplied*

*due to the under-registration of
the meters*

WATER SUPPLIED VALUE

 **AWWA Free Water Audit Software: Reporting Worksheet** WAS v5.0
American Water Works Association
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[Click to access definition](#) [Click to add a comment](#)

Water Audit Report for: **Water Town USA (xxxxxxxxx)**
Reporting Year: **2016** **7/2015 - 6/2016**

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED		Master Meter and Supply Error Adjustments	
	Enter grading in column 'E' and 'J' ----->	Point:	Value:
Volume from own sources:	<input type="text"/> 39.468 MG/Yr	<input type="text"/> -5.00%	<input type="text"/> MG/Yr
Water imported:	<input type="text"/> 5.230 MG/Yr	<input type="text"/> 1.00%	<input type="text"/> MG/Yr
Water exported:	<input type="text"/> 1.670 MG/Yr	<input type="text"/> 2.00%	<input type="text"/> MG/Yr
WATER SUPPLIED: 45.086 MG/Yr		Enter negative % or value for under-registration Enter positive % or value for over-registration	

AUTHORIZED CONSUMPTION

Billed metered:	<input type="text"/> 24.000 MG/Yr
Billed unmetered:	<input type="text"/> 1.116 MG/Yr
Unbilled metered:	<input type="text"/> 0.000 MG/Yr

Click here: [?](#) for help using option buttons below

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram ...

Water supply will be calculated based on data entered for own sources, water imported and exported (it will correct for over or under meter readings)

NEXT STEP: CUSTOMER DATA

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: 0.000 MG/Yr Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr
Unbilled unmetered: 3 0.000 MG/Yr

Default option selected for unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: 0.000 MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: 0.000 MG/Yr
Systematic data handling errors: 0.000 MG/Yr

Apparent Losses: 0.000 MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr
Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr
0.25% MG/Yr

Enter the total of all water that is metered and billed during the entire year, all the water that is billed but unmetered, all the water that is unbilled and metered and unbilled and unmetered in millions of gallons per year.

UNBILLED UNMETERED DATA

24	Billed unmetered:	+	?		MG/Yr
25	Unbilled metered:	+	?		MG/Yr
26	Unbilled unmetered:	+	?	3	0.000 MG/Yr
28	Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed				
30	AUTHORIZED CONSUMPTION: 0.000 MG/Yr				

Pcnt: 1.25% ☒ ☐ Value: MG/Yr

Use buttons to select

23	Billed metered:	+	?	118.927	MG/Yr
24	Billed unmetered:	+	?		MG/Yr
25	Unbilled metered:	+	?	1.722	MG/Yr
26	Unbilled unmetered:	+	?	3	3.481 MG/Yr
28	Unbilled Unmetered volume entered is greater than the recommended default value				
30	AUTHORIZED CONSUMPTION: 124.130 MG/Yr				

Pcnt: ☐ ☒ Value: 3.481 MG/Yr

Use buttons to select

Two choices: Either use default or enter data by changing the selection to value from percent

APPARENT LOSSES

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American WaterWorks Association
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: MG/Yr Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr
Unbilled unmetered: MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) MG/Yr

Apparent Losses

Unauthorized consumption: MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: MG/Yr
Systematic data handling errors: MG/Yr

Apparent Losses: MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr

Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr

0.25% MG/Yr

For Unauthorized consumption either choose default value of 0.25% or enter a total value of unauthorized flow in millions of gallons per year; Enter customer meter errors in percent or MG/Yr; Choose default or enter a value for data handling errors

Non-Revenue Volumes are Calculated

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

Default option selected for unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: 0.000 MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: 0.000 MG/Yr
Systematic data handling errors: 0.000 MG/Yr

Apparent Losses: 0.000 MG/Yr

Real Losses (Continuous Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 0.000 MG/Yr

WATER LOSSES: 0.000 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 0.000 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr

0.25% MG/Yr

Non-Revenue Water is calculated by the software, as are its components: authorized consumption, apparent loss, and real loss

SYSTEM CHARACTERISTICS

AWWA Free Water Audit Software: WAS v5.0
Reporting Worksheet
American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

NON-REVENUE WATER

NON-REVENUE WATER: 0.000 MG/Yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: miles
Number of active AND inactive service connections: conn./mile main
Service connection density: Select...
Are customer meters typically located at the curbside or property line? (length of service line, beyond the property boundary, that is the responsibility of the utility)
Average length of customer service line: ft
Average operating pressure: psi

COST DATA

Total annual cost of operating water system: \$/Year
Customer retail unit cost (applied to Apparent Losses):
Variable production cost (applied to Real Losses): \$/Million gallons ☐ Use Customer Retail Unit Cost to value real loss

WATER AUDIT DATA VALIDITY SCORE:

System data is entered, including: length of mains, number of connections, customer service curb stop locations, and average operating pressure

FINANCIAL INPUTS

AWWA Free Water Audit Software: WAS v5.0
Reporting Worksheet
American Water Works Association. Copyright © 2014. All Rights Reserved.

Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

NON-REVENUE WATER
NON-REVENUE WATER: 0.000 MG/Yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

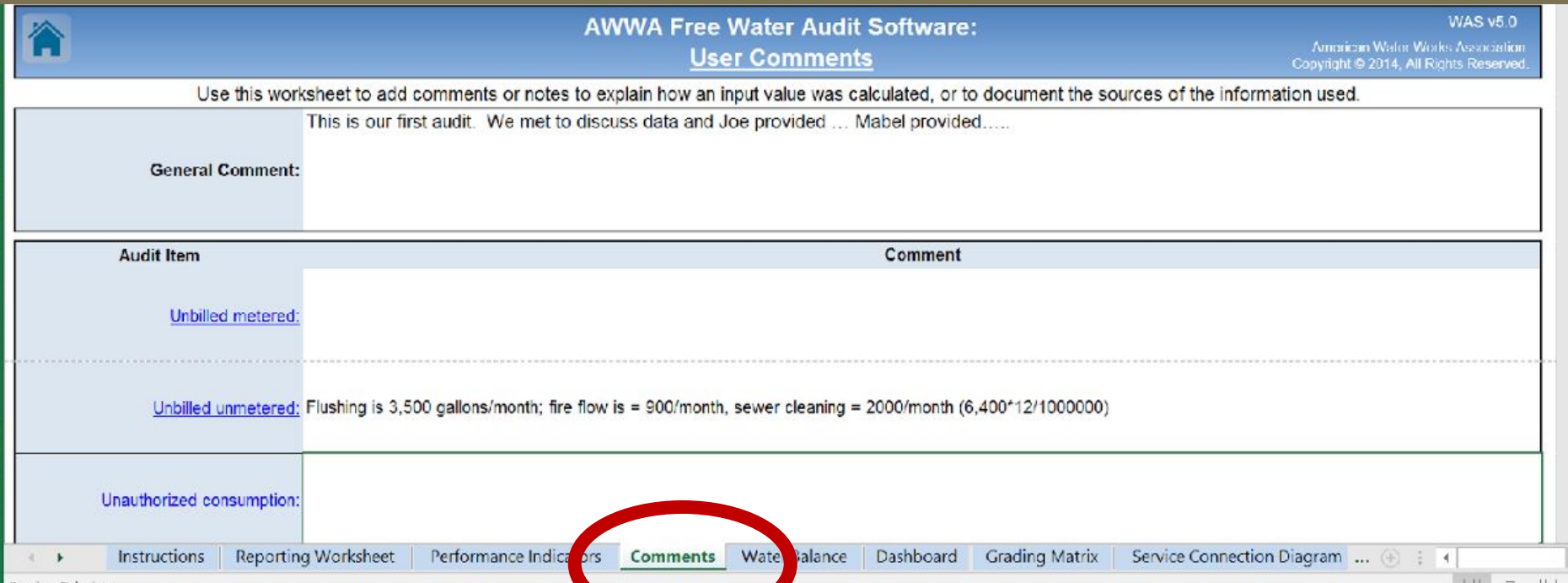
SYSTEM DATA
Length of mains: miles
Number of active AND inactive service connections:
Service connection density: conn./mile main
Are customer meters typically located at the curbside or property line? Select...
Average length of customer service line: ft (length of service line, beyond the property boundary, that is the responsibility of the utility)
Average operating pressure: psi

COST DATA
Total annual cost of operating water system: \$/Year
Customer retail unit cost (applied to Apparent Losses):
Variable production cost (applied to Real Losses): \$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

Financial information is entered, including: total annual cost of operating the system, customer retail unit cost, and variable production cost

A HANDY FEATURE: COMMENTS SECTION



The screenshot shows the 'User Comments' section of the AWWA Free Water Audit Software (v5.0). The interface includes a blue header bar with a home icon, the software title, and version information. Below the header, a text box for 'General Comment' contains the text: 'This is our first audit. We met to discuss data and Joe provided ... Mabel provided.....'. A table with two columns, 'Audit Item' and 'Comment', follows. The 'Audit Item' column lists 'Unbilled metered:', 'Unbilled unmetered:', and 'Unauthorized consumption:'. The 'Comment' column for 'Unbilled unmetered:' contains the text: 'Flushing is 3,500 gallons/month; fire flow is = 900/month, sewer cleaning = 2000/month (6,400*12/1000000)'. At the bottom, a navigation bar with tabs for 'Instructions', 'Reporting Worksheet', 'Performance Indicators', 'Comments', 'Water Balance', 'Dashboard', 'Grading Matrix', and 'Service Connection Diagram' is shown. The 'Comments' tab is highlighted with a red circle.

AWWA Free Water Audit Software: WAS v5.0
User Comments
American Water Works Association
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Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:
This is our first audit. We met to discuss data and Joe provided ... Mabel provided.....

Audit Item	Comment
Unbilled metered:	
Unbilled unmetered:	Flushing is 3,500 gallons/month; fire flow is = 900/month, sewer cleaning = 2000/month (6,400*12/1000000)
Unauthorized consumption:	

Instructions | Reporting Worksheet | Performance Indicators | **Comments** | Water Balance | Dashboard | Grading Matrix | Service Connection Diagram ...


Use the comments field as
much as possible!!

Is the data you
obtain going to
be completely
acurate?



Why or why not?

NEED TO GRADE EACH ENTRY



AWWA Free Water Audit Software:
Reporting Worksheet

WASv5.0
American Water Works Association.
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?

Click to access definition

+

Click to add a comment

Water Audit Report for: Watertown USA Water Treatment Works (XXXXYYYY)

Reporting Year: 2014 1/2014 - 12/2014

WATER SUPPLIED

Volume from own sources:

+ ? 5

 95.206 MG/Yr

Water imported:

+ ?

 MG/Yr

Water exported:

+ ?

 MG/Yr

WATER SUPPLIED: 96.151 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:

+ ? 6

 80.408 MG/Yr

Billed unmetered:

+ ? 8

 0.048 MG/Yr

Unbilled metered:

+ ? 1

 1.250 MG/Yr

Unbilled unmetered:

+ ? 2

 1.450 MG/Yr

Unbilled Unmetered volume entered is greater than the recommended default value

AUTHORIZED CONSUMPTION: ? 83.156 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

14.995 MG/Yr

Apparent Losses

Master Meter and Supply Error Adjustments

Pcnt:

+ ? 2

 -3.00% Value: MG/Yr

MG/Yr

MG/Yr

Enter negative % or value for under-registration

Enter positive % or value for over-registration

Click here: ? for help using option buttons below

Pcnt: Value: MG/Yr

1.450 MG/Yr

buttons to select percentage of water supplied OR value

Pcnt: Value:

Instructions

Reporting Worksheet

Performance Indicators

Comments

Water Balance


Dashboard

Grading Matrix

Service Connection Diagram

Data Grades

How Do You Know What Data Grade To Use?



AWWA Free Water Audit Software
Reporting Worksheet

?

Click to access definition

+

Click to add a comment

Water Audit Report for: Watertown USA Water Treatment Works (X
Reporting Year: 2014 1/2014 - 12/2014

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable, indicate the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover t

All volumes to be entered as: MILLION GALLONS (US)

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WA

Hover the cursor over the red triangle in the corner

Volume from own sources: 5 95.206 MG/Yr

Water imported: + ? MG/Yr

Water exported: + ? MG/Yr

WATER SUPPLIED:

98.151 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: + ? 6 80.408 MG/Yr

----- Enter grading in column

How Do You Know What Data Grade To Use?

For data grading for each input, determine the highest grade that meets or exceeds all criteria for that grade and all grades below

			Master Meter and Supply Error Adjustments	
			Pct:	Value:
Time from own sources: + ? 5			n/a (not applicable). Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	
Water imported: + ?			1. Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	
Water exported: + ?			2. 25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	
WATER SUPPLIED:			3. Conditions between 2 and 4	
Billed metered: + ? 6			4. 50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	
Billed unmetered: + ? 8			5. Conditions between 4 and 6	
Unbilled metered: + ? 1			6. At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	
Unbilled unmetered: + ? 2			7. Conditions between 6 and 8	
Unmetered volume entered is greater than metered volume			8. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	
SIZED CONSUMPTION: ?			9. Conditions between 8 and 10	
			10. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.	

The Data Grades will show up in a pop-up box.

The Pop-Up Boxes Can Be a Little Hard to Read and Use.....

For data grading for each input, determine the highest grade that meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J' →

	+	?		Percent	Value
Water from own sources:	+	?	5	n/a (not applicable). Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	
Water imported:	+	?		1. Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	
Water exported:	+	?		2. 25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	
WATER SUPPLIED:				3. Conditions between 2 and 4	
Billed metered:	+	?	6	4. 50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	
Billed unmetered:	+	?	8	5. Conditions between 4 and 6	
Unbilled metered:	+	?	1	6. At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	
Unbilled unmetered:	+	?	2	7. Conditions between 6 and 8	
Unmetered volume entered is greater than metered volume				8. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	
PER CAPITA CONSUMPTION:				9. Conditions between 8 and 10	
	?			10. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.	

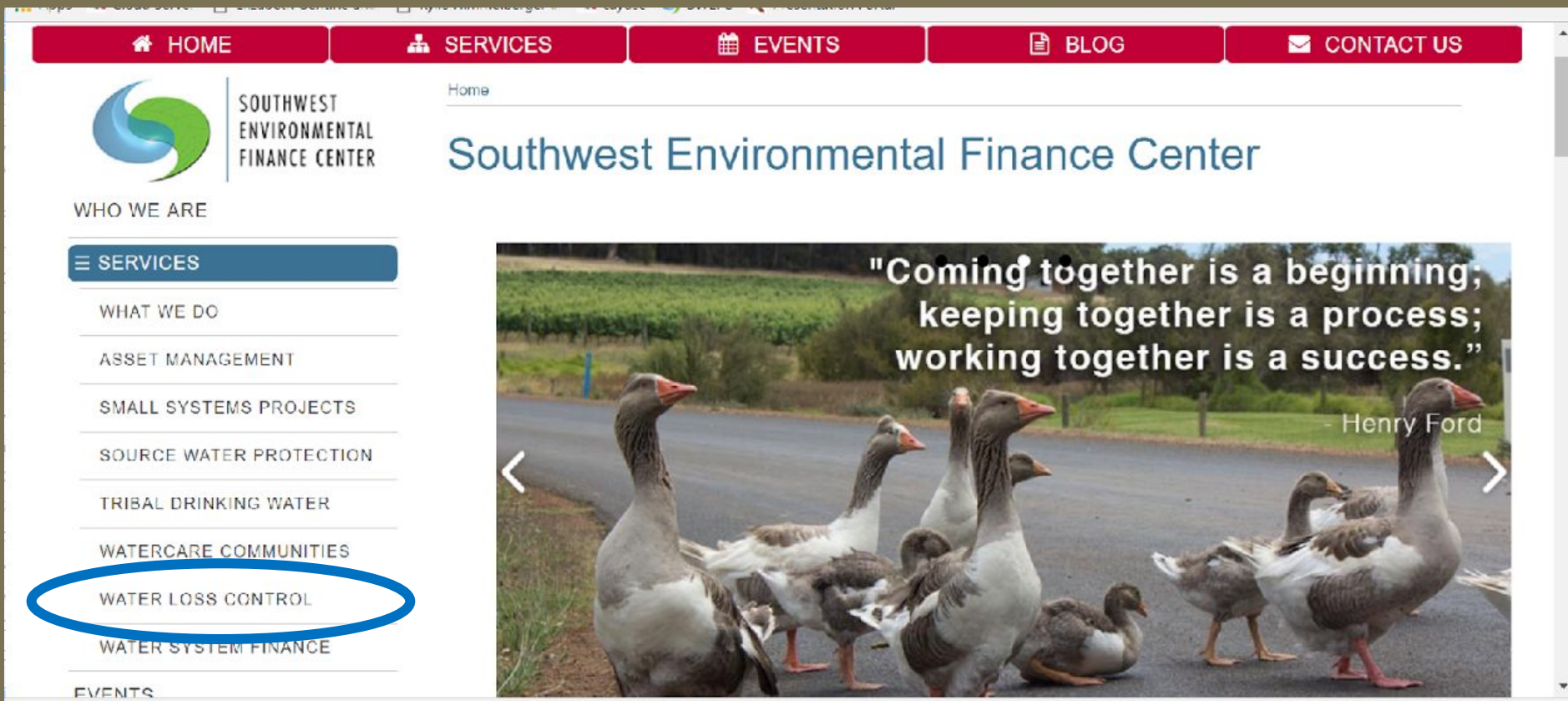
The Data Grades will show up in a pop-up box.

So, Southwest EFC Developed Data Grade Spreadsheets to Help Select Data Grades

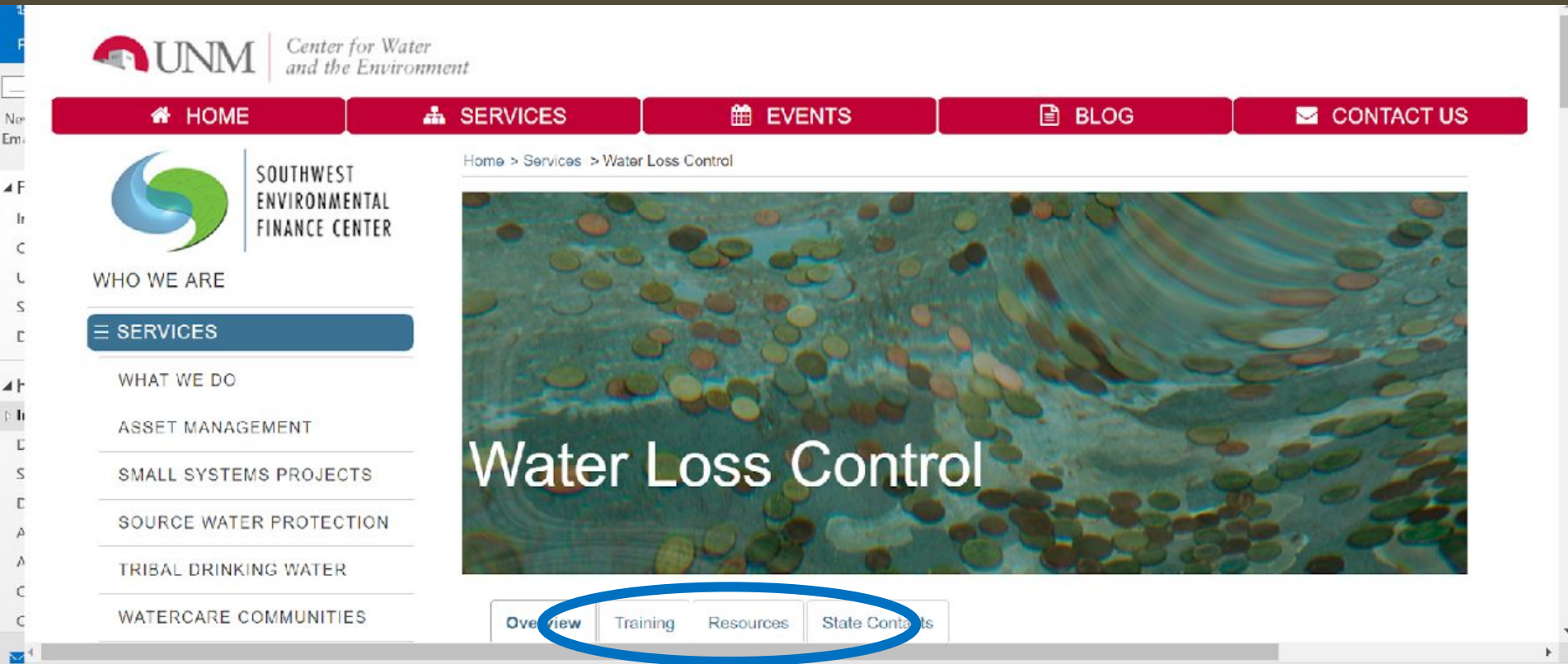
Volume from own sources		
GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1		Less than 25% of water production sources are metered, remaining sources are estimated.
		No regular meter accuracy testing or electronic calibration conducted.
2		25% - 50% of treated water production sources are metered; other sources estimated.
		No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4		50% - 75% of treated water production sources are metered, other sources estimated.
		Occasional meter accuracy testing or electronic calibration conducted
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources.
		Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually.
		Less than 25% of tested meters are found outside of +/- 6% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered,
		Meter accuracy testing and electronic calibration of related instrumentation is conducted annually,
		Less than 10% of meters are found outside of +/- 6% accuracy
9		Conditions between 8 and 10
10		100% of treated water production sources are metered,
		Meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy.
		Procedures are reviewed by a third party knowledgeable in the M36 methodology

Obtain from: Southwestefc.unm.edu

OBTAINING DATA GRADING SHEETS



OBTAINING DATA GRADING SHEETS



The screenshot displays the website of the UNM Center for Water and the Environment. The header features the UNM logo and the center's name. A navigation bar includes links for HOME, SERVICES, EVENTS, BLOG, and CONTACT US. The left sidebar contains the Southwest Environmental Finance Center logo, a 'WHO WE ARE' section, and a 'SERVICES' menu with options like WHAT WE DO, ASSET MANAGEMENT, SMALL SYSTEMS PROJECTS, SOURCE WATER PROTECTION, TRIBAL DRINKING WATER, and WATERCARE COMMUNITIES. The main content area shows a breadcrumb trail 'Home > Services > Water Loss Control' above a large image of water with coins. The title 'Water Loss Control' is overlaid on the image. At the bottom, a tabbed interface has four tabs: 'Overview' (highlighted with a blue circle), 'Training', 'Resources', and 'State Contacts'.

UNM Center for Water and the Environment

HOME SERVICES EVENTS BLOG CONTACT US

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

WHO WE ARE

SERVICES

WHAT WE DO

ASSET MANAGEMENT

SMALL SYSTEMS PROJECTS

SOURCE WATER PROTECTION

TRIBAL DRINKING WATER

WATERCARE COMMUNITIES

Home > Services > Water Loss Control

Water Loss Control

Overview Training Resources State Contacts

OBTAINING DATA GRADING SHEETS

Recent Posts

- Regulations: Love 'em or Hate 'em,
- Common Sense or Overreach
- Are You Paying Too Much? Understanding your energy rate schedules
- Toxic Water – Our Responsibility
- Have you seen the electric bill?
- Asset Management

Events Calendar

Mar 2017						
M	T	W	T	F	S	S
27	28	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2

Water Audit Data Grading Sheets

[illegible]

A significant component of the water loss Water Audit Software is data grading. As you will see when you review the AWWA Water Audit software, each data input and output you report in the software is graded for reliability on a scale of 1-10. However, due to the software's Excel format, the data grading criteria are somewhat difficult to read in the spreadsheet. For your convenience we have reproduced the grading criteria and instructions for each input in a Word Document, which can be downloaded [HERE](#).

To select the correct data loading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

The data grades will be entered in columns E and J of the worksheet in cells denoted with a red triangle in their upper right hand corners as shown in the image at the left. Click on the image to expand.

There is One Sheet for Each Data Input

Volume from own sources

GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1		Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.
2		25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4		50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered, Meter accuracy testing and electronic calibration of related instrumentation is conducted annually, Less than 10% of meters are found outside of +/- 6% accuracy
9		Conditions between 8 and 10
10		100% of treated water production sources are metered, Meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology

Note that Data Grades Are Related to Practices, Policies Procedures

For Example: The Data Grade for Volume of Own Sources is Related to Three Things:

**% of water production sources metered
Meter accuracy testing & Electronic Calibration
Accuracy of the Meter**

GRADE	✓	
n/a		Select (of its own)
1		Less than 100%
2		
3		
4		
5		
6		
7		
8		100% of treated water production is metered Meter accuracy testing and electronic calibration is conducted semi-annually, with less than 10% found outside of +/- 3% Procedures are reviewed by a person knowledgeable in the M36 methodology
9		Conditions between 100% of treated water production is metered and 100% of treated water production is metered
10		100% of treated water production is metered

To Use the Data Grade Spreadsheets: Choose a Starting Point:

Volume from own sources

GRADE	✓	DESCRIPTION
1	✓	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1	✓	Less than 25% of water production sources are metered, remaining sources are estimated.
1	✓	No regular meter accuracy testing or electronic calibration conducted.
2		25% - 50% of treated water production sources are metered; other sources estimated.
2		No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4		50% - 75% of treated water production sources are metered.
4		Occasional meter accuracy testing or electronic calibration conducted.
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered.
6		Meter accuracy testing and/or electronic calibration conducted.
6		Less than 25% of tested meters are found outside of +/- 6% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered.
8		Meter accuracy testing and electronic calibration of related instrumentation is conducted annually.
8		Less than 10% of meters are found outside of +/- 6% accuracy
9		Conditions between 8 and 10
10		100% of treated water production sources are metered.
10		Meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy.
10		Procedures are reviewed by a third party knowledgeable in the M36 methodology


If you can **meet or exceed ALL** the criteria, in the box, move up to the next higher number

Some Grades are “Conditions Between” Two Grades

Volume from own sources		
GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1	✓	Less than 25% of water production sources are metered, remaining sources are estimated.
	✓	No regular meter accuracy testing or electronic calibration conducted.
2	✓	25% - 50% of treated water production sources are metered; other sources estimated.
	✓	No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4	✓	50% - 75% of treated water production sources are metered, other sources estimated.
		Occasional meter accuracy testing or electronic calibration conducted
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources.
		Meter accuracy testing and/or electronic calibration conducted annually.
		Less than 25% of tested meters are found outside of +/- 3% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered.
		Meter accuracy testing and electronic calibration conducted annually.
		Less than 10% of meters are found outside of +/- 3% accuracy.
9		Conditions between 8 and 10
10		100% of treated water production sources are metered.
		Meter accuracy testing and electronic calibration conducted annually, with less than 10% found outside of +/- 3% accuracy.
		Procedures are reviewed by a third party knowledgeable in the M36 methodology

If you are able to check **ALL** the boxes on the number below and only **SOME** of the boxes on the number above, choose the “conditions between...” box.

Data Grade Entry



AWWA Free Water Audit Software:
Reporting Worksheet

WASv5.0
American Water Works Association.
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?

Click to access definition

+

Click to add a comment

Water Audit Report for: Watertown USA Water Treatment Works (XXXXYYYY)
Reporting Year: 2014 1/2014 - 12/2014

WATER SUPPLIED

Volume from own sources: +

5

 95.206 MG/Yr
Water imported: +

?

 MG/Yr
Water exported: +

?

 MG/Yr

WATER SUPPLIED: 96.151 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: +

6

 80.408 MG/Yr
Billed unmetered: +

8

 0.048 MG/Yr
Unbilled metered: +

1

 1.250 MG/Yr
Unbilled unmetered: +

2

 1.450 MG/Yr

AUTHORIZED CONSUMPTION:

?

 83.156 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

14.995 MG/Yr

Apparent Losses

Master Meter and Supply Error Adjustments

Pcnt: -3.00% Value: MG/Yr
MG/Yr
MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Click here: ?
for help using option
buttons below

Pcnt: Value: MG/Yr
1.450 MG/Yr

buttons to select
percentage of water
supplied
OR
value

Instructions

Reporting Worksheet

Performance Indicators

Comments

Water Balance

Dashboard

Grading Matrix

Service Connection Diagram

Data
Grades

The most important thing is to make sure you are honest about what the data grade should be!!!

The right data grade is the one that accurately reflects your situation

Overall Validity Score

AWWA Free Water Audit Software: Reporting Worksheet

Water Audit Report for: **Green Valley Water System (XXXXXXXX)**
Reporting Year: **2012** **1/2012 - 12/2012**

COST DATA

Total annual cost of operating water system:	+	?	4	\$400,000	\$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	1	\$2.00	\$/1000 gallons (US)
Variable production cost (applied to Real Losses):	+	?	1	\$2,000.00	\$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses:

Retail costs are less than (or equal to) production costs; please review and correct if necessary

WATER AUDIT DATA VALIDITY SCORE:

Add a grading value for 2 parameter(s) to enable an audit score to be calculated


PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Volume from own sources
- 2: Billed metered
- 3: Billed unmetered

If you miss any grades you will get message

Overall Validity Score

 **AWWA Free Water Audit Software:
Reporting Worksheet** WAS v5.0
American Water Works Assoc
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[?](#) Click to access definition
[+](#) Click to add a comment

Water Audit Report for: **Watertown USA Water Treatment Works (XXXXYYYY)**
Reporting Year: **2014** **1/2014 - 12/2014**

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 49 out of 100 *****

A weighted scale for the components of consumption and loss is used in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Unbilled metered

3: Customer metering inaccuracies

**Water Audit
Data Validity
Score**

Validity Priorities

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Assoc
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Water Audit Report for: Watertown USA Water Treatment Works (XXXXYYYYY)
Reporting Year: 2014 1/2014 - 12/2014

WATER AUDIT DATA VALIDITY SCORE:

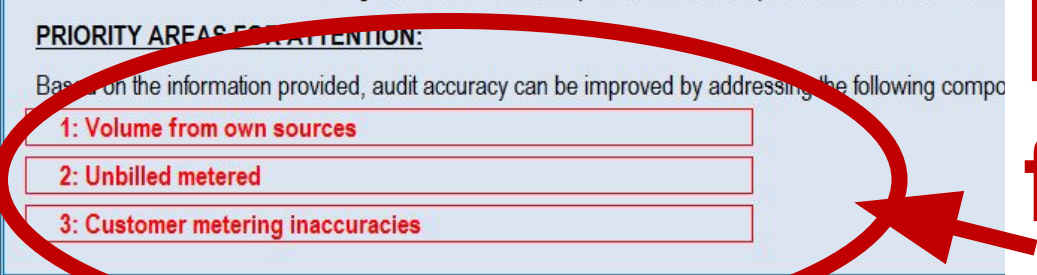
*** YOUR SCORE IS: 49 out of 100 ***

A weighted scale for the components of consumption and water loss is included.

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Volume from own sources
- 2: Unbilled metered
- 3: Customer metering inaccuracies



**Priority Areas
for Attention to
Increase
Validity Score**

Note: The data grades do not have equal value in the calculation of validity

If the Data Validity Score is Low, What Should be the Response?

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
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Click to access definition
Click to add a comment

Water Audit Report for: Watertown USA Water Treatment Works (XXXXYYYY)
Reporting Year: 2014 1/2014 - 12/2014

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 49 out of 100 *****

A weighted scale for the components of consumption and loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Volume from own sources
- 2: Unbilled metered
- 3: Customer metering inaccuracies

**What
Response?**

The Three Results of the Water Audit





AWWA Free Water Audit Software: System Attributes and Performance Indicators

WAS v5.0

American Water Works Association
Copyright © 2014 All Rights ReservedWater Audit Report for: Green Village Water Utility (000000)

Reporting Year: 2010 | 7/2015 - 6/2016

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 30 out of 100 ***

System Attributes:

Apparent losses:	0.318	MG/yr
Real losses:	3.314	MG/yr
= Water Losses:	3.622	MG/yr

Unavoidable Annual Real Losses (UARL): See limits in definition MG/yrAnnual cost of Apparent Losses: \$537Annual cost of Real losses: \$1,626 Valued at Variable Production Cost[Return to Reporting Worksheet to change this assumption](#)

Performance Indicators:

Financial

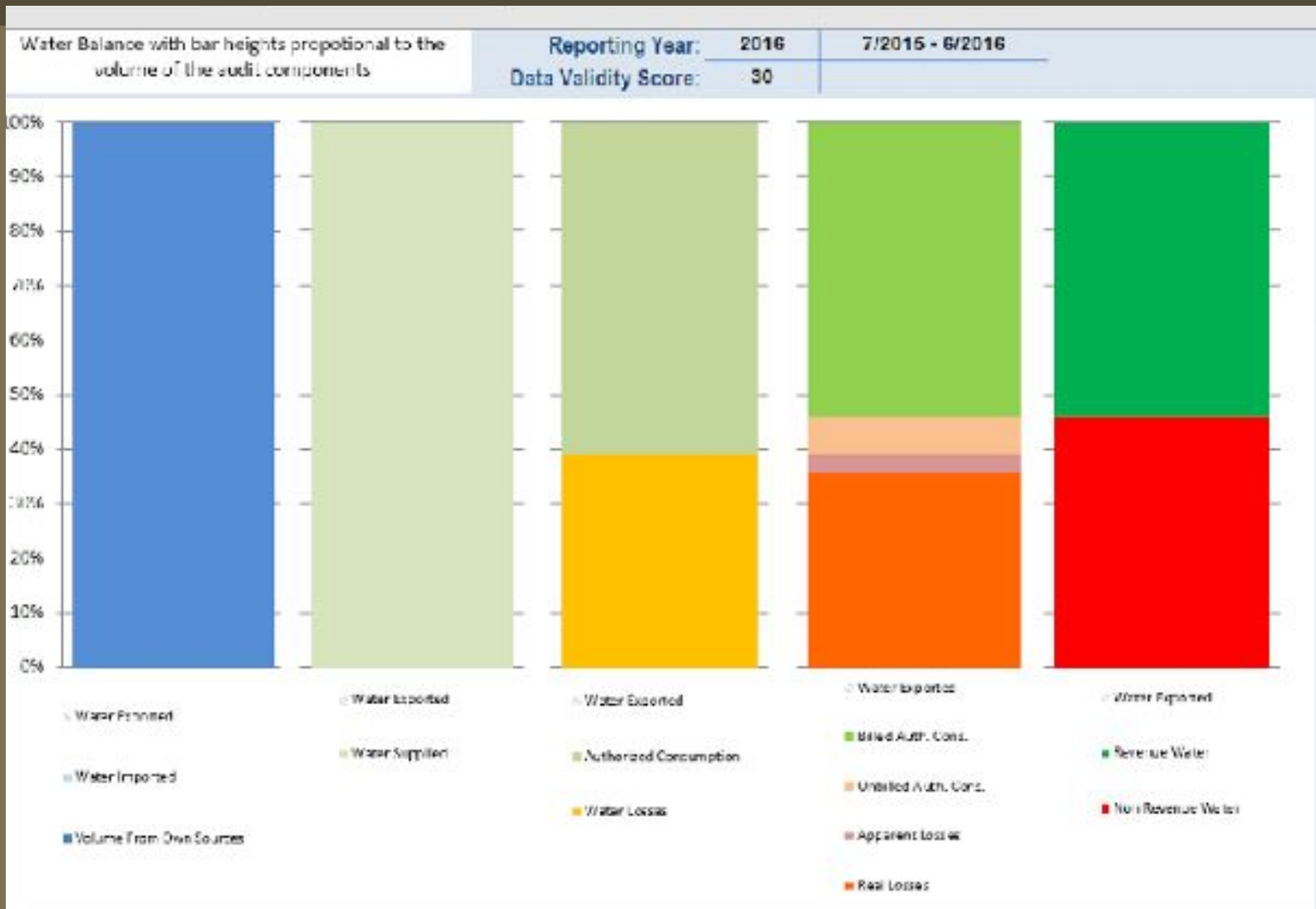
Non-revenue water as percent by volume of Water Supplied:	15.8%	
Non-revenue water as percent by cost of operating system:	4.1%	Real Losses valued at Variable Production Cost

Operational Efficiency:

Apparent Losses per service connection per day:	7.04	gallons/connection/day
Real Losses per service connection per day:	81.36	gallons/connection/day
Real Losses per length of main per day [*] :	N/A	
Real Losses per service connection per day per psi pressure:	1.03	gallons/connection/day/psi

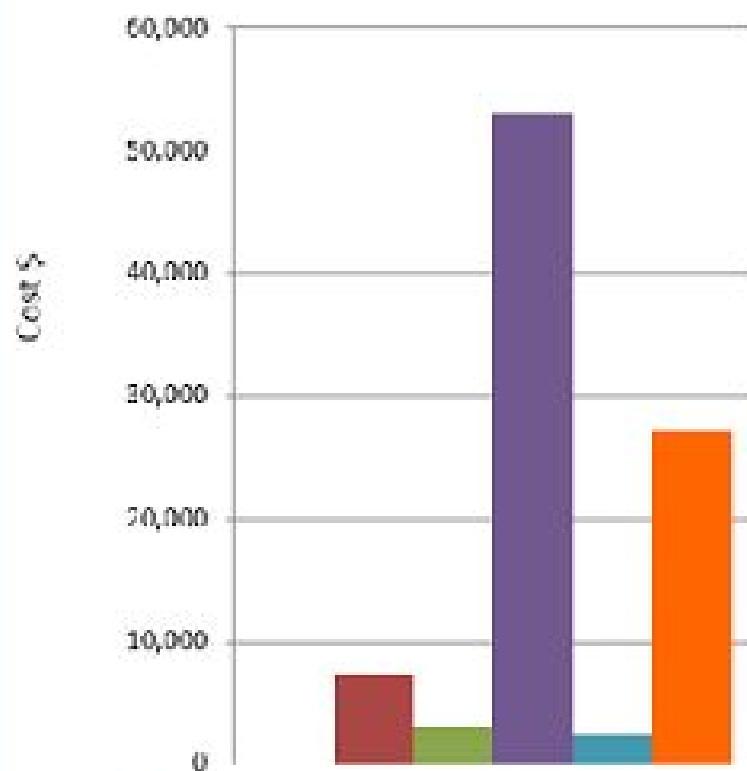
From Above, Real Losses = Current Annual Real Losses (CARL): 3.30 million gallons/yearInfrastructure Leakage Index (ILI) [CARL/UARL]: ^{*} This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline[Instructions](#)[Reporting Worksheet](#)[Performance Indicators](#)[Comments](#)[Water Balance](#)

THE DASHBOARD



- Show me the VOLUME of Non-Revenue Water
- Show me the COST of Non-Revenue Water

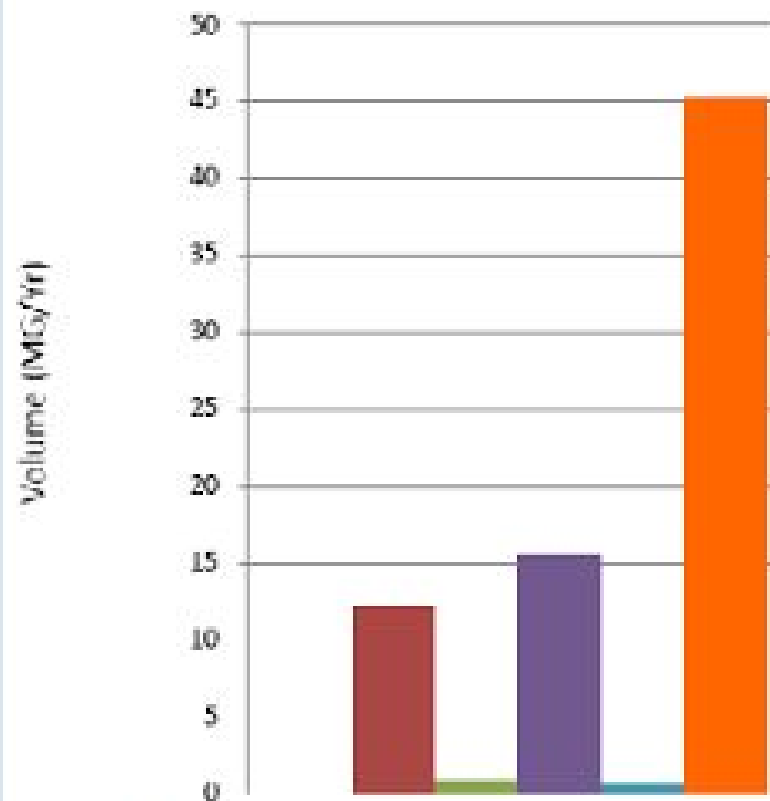
Total Cost of NRW - \$93,351



- Unbilled metered (valued at Var. Prod. Cost)
- Unbilled unmetered (valued at Var. Prod. Cost)
- Unauth. consumption
- Civil metering inaccuracies
- Syst. data handling errors
- Real Losses (valued at Var. Prod. Cost)

- Show me the VOLUME of Non-Revenue Water
- Show me the COST of Non-Revenue Water

Total Volume of NRW - 75 MG/Yr



- Unbilled metered (valued at Var. Prod. Cost)
- Unbilled unmetered (valued at Var. Prod. Cost)
- Unauth. consumption
- Civil metering inaccuracies
- Syst. data handling errors
- Real Losses (valued at Var. Prod. Cost)

THE WATER BALANCE IS FILLED OUT BY THE SOFTWARE

Water Audit Report for: Green Village Water Utility (ssssxxx)		Reporting Year: 20167/2016 - 6/2016		Data Validity Score: 30	
Own Sources (Adjusted for known errors) 9.248 System Input 9.248 Water Imported 0.000	Water Exported 0.000	Authorized Consumption 5.626 Water Losses 3.622	Billed Water Exported	Revenue Water 0.000	Revenue Water 5.010 Non-Revenue Water (NRW) 4.238
	Water Supplied 9.248		Billed Authorized Consumption 5.010	Billed Metered Consumption (water exported is removed) 5.010	
			Unbilled Authorized Consumption 0.616 Apparent Losses 0.318	Billed Unmetered Consumption 0.000	
				Unbilled Metered Consumption 0.500	
				Unbilled Unmetered Consumption 0.116	
				Unauthorized Consumption 0.015	
				Customer Metering Inaccuracies 0.290	
			Real Losses 3.304	Systematic Data Handling Errors 0.013	
				Leakage on Transmission and/or Distribution Mains Not broken down	
				Leakage and Overflows at Utility's Storage Tanks Not broken down	
				Leakage on Service Connections Not broken down	

Instructions	Reporting Worksheet	Performance Indicators	Comments	Water Balance	Dashboard	Grading Mat
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WHAT TO DO NEXT: LOOK AT THE TOOLBOX



Helps to Address	The Toolbox (Basic)	Cost Range
Data Validity, Data Results Out of Range	1 - Validation of supply & consumption volumes; Look for Data Grade Improvements	Low-Mid
Validity, Billed Unmetered Use, Unbilled Unmetered Use	2 - Estimating and tracking unmetered use	Low
Validity	3 – Master Meter Annual Testing Program	Low - Mid
Validity; Other Benefits Related to Asset Inventory & Management	4 – Mapping the System	Low - Mid
Authorized, Unbilled usage	5 – Review Policies & Procedures for unbilled customers	Low
Authorized, Unbilled Use	7 - Installing meters on unmetered connections	Mid
Unbilled unmetered	6 - Unidirectional flushing program	Low
Customer metering inaccuracy	8 - Meter testing & replacement	Mid-High
Unauthorized Use	9 - Theft Deterrence	Low - Mid
Systematic Data Handling Errors	10 - Billing system audit	Low-Mid
Real Losses	11 – Collecting & Analyzing Break Data	Low
Real Losses	12 - Improve speed/quality of repairs	Low
Real Losses	13 - Locate & eliminate pressure transients (surges, water hammer)	Low-Mid
Real Losses	14 – Night Flow Analysis	Mid
Real Losses	15 - Reduce peak and overall pressure	Mid-High
Real Losses: Leakage on Mains	16 – Main Replacement	High
Real Losses: Leakage on Services	17 – Service Replacement	Mid - High
Real Losses: Unreported Leaks	18 - Acoustic leak survey	Mid

If you take the time
to do a water audit
and check the data
there are cost
benefits to doing it.



What I
LEARNED

What can you do at
your own facility



Don't Let what you
can't do stop you
from doing what you
can do.

CONTACT US WITH QUESTIONS OR FOR HELP

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**Southwest
Environmental
Finance
Center**