Smart Management for Small Water Systems

EFCN
environmental finance center network

NADO
NATIONAL ASSOCIATION OF DEVELOPMENT ORGANIZATIONS

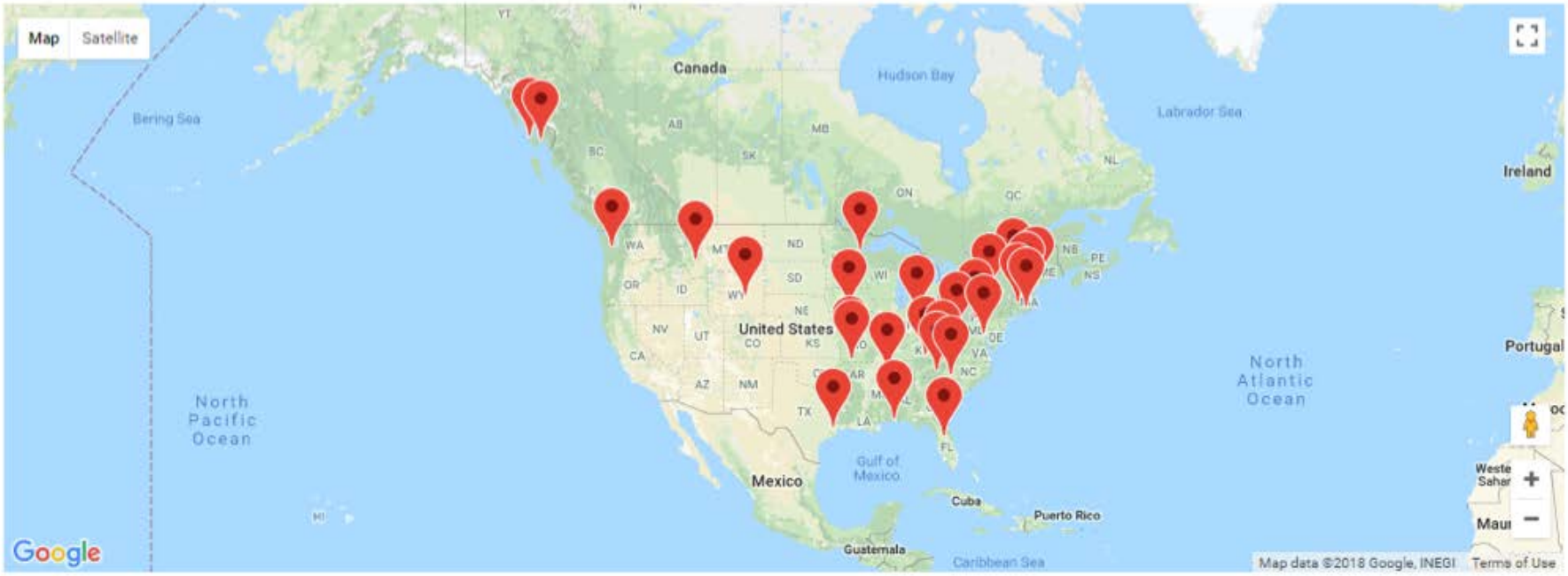
Government Finance Officers Association

Our current round of funding for the EPA Training and Technical Assistance Grant is going strong

We have 25+ workshops and webinars coming up in the next few months

http://efcnetwork.org/upcoming-events/

Upcoming Events



= In Person Event

= Webinar

Smart Management for Small Water Systems

EFCN
environmental finance center network

NADO
NATIONAL ASSOCIATION OF DEVELOPMENT ORGANIZATIONS

Government Finance Officers Association

We are about to start our calls with states, territories and EPA about grant activities for 2019 and 2020.

This webinar will explain many of the in-person workshop options we are offering this year

Fiscal Management for Water Systems

Full day

Includes any size system

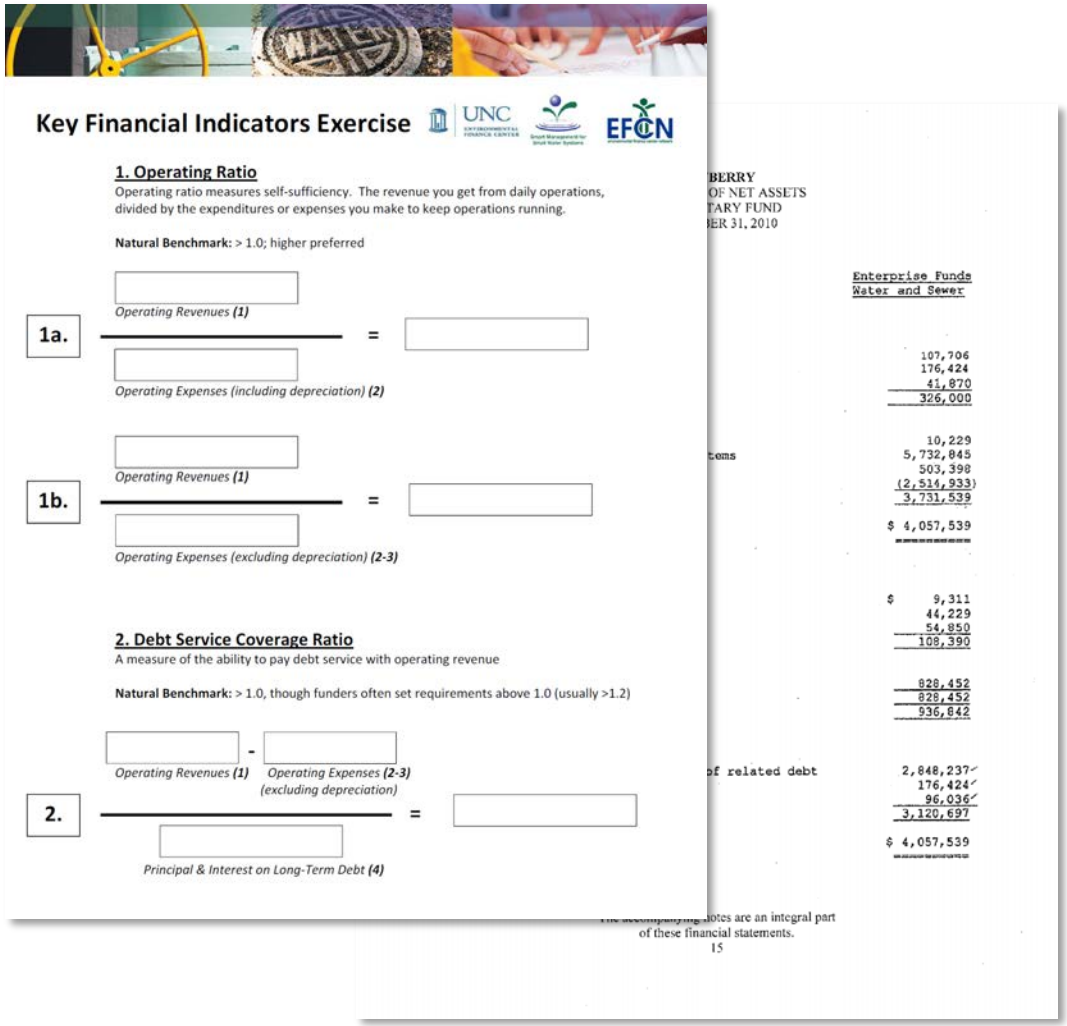
Presentations, discussion, case studies, exercises, videos

Funders are invited to present

Typical Full-Day Agenda

9:00 – 9:30	Welcome and Introductions
9:30 – 10:00	Presentations from Funding Programs
10:00 – 11:00	Water Finance 101
11:00 – 12:00	Measuring Water System Financial Health, including an exercise
12:00 – 1:15	Lunch on your own
1:15 – 3:00	Long Term System Planning: Asset Management and Capital Planning, including an exercise
3:00 – 4:30	Rate Structures

Exercises



Key Financial Indicators Exercise

UNC | EFC

1. Operating Ratio

Operating ratio measures self-sufficiency. The revenue you get from daily operations, divided by the expenditures or expenses you make to keep operations running.

Natural Benchmark: > 1.0; higher preferred

1a. *Operating Revenues* **(1)** / *Operating Expenses (including depreciation)* **(2)** =

1b. *Operating Revenues* **(1)** / *Operating Expenses (excluding depreciation)* **(2-3)** =

2. Debt Service Coverage Ratio

A measure of the ability to pay debt service with operating revenue

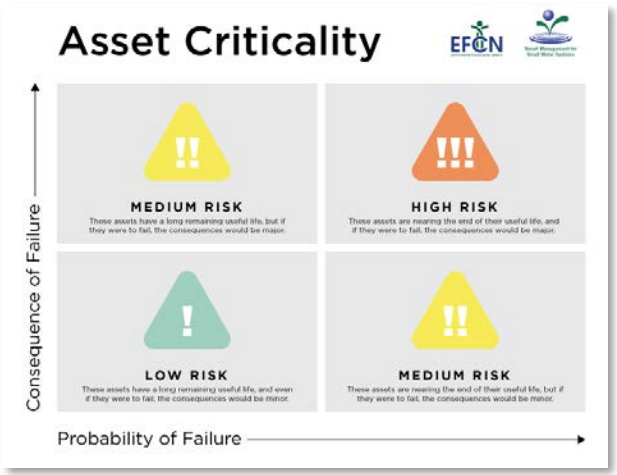
Natural Benchmark: > 1.0, though funders often set requirements above 1.0 (usually >1.2)

2. (*Operating Revenues* **(1)** - *Operating Expenses* **(2-3)** *(excluding depreciation)*) / *Principal & Interest on Long-Term Debt* **(4)** =

BERRY
OF NET ASSETS
TARY FUND
ER 31, 2010

	Enterprise Funds Water and Sewer
	107,706
	176,424
	41,870
	326,000
tems	10,229
	5,732,845
	503,398
	(2,514,933)
	3,731,539
	$ 4,057,539
	$ 9,311
	44,229
	54,850
	108,390
	828,452
	828,452
	936,842
of related debt	2,848,237
	176,424
	96,036
	3,120,697
	$ 4,057,539

The accompanying notes are an integral part of these financial statements.
15



1. Brand new storage tank
2. Booster pump serving a hospital and neighborhood
3. 20 year old pipes in a neighborhood
4. 20 year old meters

Outcomes/Potential Outcomes

Systems begin to think of themselves from a financial standpoint

Systems learn how to measure their financial health

Systems adjust their rates in order to meet their current and future financial needs

Systems network and share experiences with each other

Setting the Right Rates for Your System

Full day

Includes any size system, though best suited for systems that charge separately for water

Presentations, discussion, case studies, exercises

Funders are invited to present

Typical Full-Day Agenda

9:00 – 9:30	Welcome and Introductions
9:30 – 10:00	Presentations from Funding Programs
10:00 – 11:00	Water System Objectives, including an exercise
11:00 – 12:00	Determining the Cost of Water Service, including an exercise
12:00 – 1:15	Lunch on your own
1:15 – 3:00	Pricing Water for Full Cost Recovery, including an exercise
3:00 – 4:30	Pricing Water for Other Objectives

Exercises

Small town with a water and wastewater system *

Population: 1,100

Service Connections: 450

MHI: $24,432

** Actual budget from an actual small system!*

Full Cost Pricing Exercise

UNC ENVIRONMENTAL FINANCE CENTER | Smart Management for Small Water Systems | EFCN

1. Payment for Access (Fixed Monthly Bill)

$$\frac{\text{Total Needed Revenue}}{\text{Total Accounts}} = \frac{\text{Total Annual Bill}}{12} = \text{Monthly Bill}$$

2. Payment for Volume of Product Received

	1,000 gallons/month	4,000 gallons/month	12,000 gallons/month	34,000 gallons/month
Payment for Access (Fixed Monthly Bill)	$63.79	$63.79	$63.79	$63.79
Payment for Volume of Product Received	$10.48	$41.92	$125.76	$356.32
Base Charge for Fixed Costs; Volumetric Charge for Variable Costs	$55.67	$60.44	$73.16	$108.14
$25 Base Charge; Volumetric Charge for Rest	$31.37	$50.48	$101.44	$241.58

Outcomes/Potential Outcomes

Systems identify their objectives

Systems learn how to calculate revenue requirements

Systems practice developing rates and understanding the impact of those rates on different types of customers

Systems network and share experiences with each other

Water Conservation Finance

NEW!

Full day

Includes any size system

Presentations, discussion, case studies, exercises

Funders are invited to present

Typical Full-Day Agenda

9:00 – 9:30	Welcome and Introductions
9:30 – 10:00	Presentations from Funding Programs
10:00 – 11:00	Why Conserve?
11:00 – 12:00	Understanding Real Water Loss, including an exercise
12:00 – 1:15	Lunch on your own
1:15 – 3:00	Non-Price Approaches to Conservation
3:00 – 4:30	Pricing Approaches to Conservation, including an exercise

Exercises

Small town with a water and wastewater system *

Population: 1,100

Service Connections: 450

MHI: $24,432

** Actual budget from an actual small system!*

Conservation Pricing Exercise

1. Payment for Volume of Product Received

$$\frac{\text{Total Needed Revenue}}{\text{Total Gallons}} \times 1{,}000 = \text{Price per 1,000 Gallons}$$

2. $20 Base Charge; Volumetric Charge for Rest

Gallons per Month:				
Winter Gallons	4,000	4,000	10,000	34,000
Summer Indoor	*4,000*	*4,000*	*10,000*	*34,000*
Summer Outdoor	*0*	*11,000*	*0*	*0*
Summer Gallons	4,000	15,000	10,000	34,000
Volume of Product Received	$57.96	$217.35	$144.90	$492.66
$20 Base Charge; Rest Volumetric	$64.84	$188.15	$132.10	$401.14
Seasonal Rates	$71.80	$214.25	$149.50	$460.30
Irrigation Rates	$54.40	$263.73	$106.00	$312.40

Outcomes/Potential Outcomes

Systems consider why they may wish to promote conservation

Systems learn pricing and non-pricing approaches to conservation

Systems understand the revenue ramifications of conservation

Systems network and share experiences with each other

Asset Management

- Introduction, Intermediate or Advanced
- Typically a full day
- Each workshop includes
  - Instruction with PowerPoint slides (available on website for download after workshop)
  - Hands-on workshops
  - Tools available and how they can be used
  - Discussion specific to attendees

Asset Management for Water Systems: Optimizing Asset Life for Sustained Operations

- In this workshop, you will learn about how asset management can benefit your system. Not sure where to begin? We will provide you with the tools you need to get started and will walk you through the process.
- With limited revenues, aging infrastructure, and regulatory obligations to meet, a comprehensive approach to managing your system is vital. You may have problems related to unknown meter, valve, or hydrant locations. You may not be sure of which asset(s) to replace given limited funds. Asset Management can help you solve these problems, and more.
- **You will learn how to:**
- - Develop an inventory of utility components
- - Identify critical assets for sustained operations
- - Make decisions about how to operate, maintain, repair, and replace those assets
- - Set goals for level of service at a sustainable cost

Training Objectives:

- Obtain a solid understanding of what asset management is and how it benefits water systems
- Identify the 5 core components of asset management
- Understand the major components that need to be included in an asset inventory
- Articulate the importance of setting and measuring level of service goals
- Know how to calculate asset criticality
- Identify resources and next steps for applying asset management to your water utility

Typical Full-Day Agenda

- 9:00 – 9:15 Welcome and Introductions
- 9:15 – 9:45 Biggest Issues/Concerns with Your Water Utility
- 9:45 – 10:15 Introduction to Asset Management
- 10:15 – 10:45 Current State of the Assets
- 10:45 – 11:00 Break
- 11:00 – 11:30 Current State of the Assets Workshop
- 11:30 – 12:00 Level of Service
- 12:00 – 1:00 Lunch (On Your Own)
- 1:00 – 1:30 Criticality
- 1:30 – 2:15 Criticality Workshop
- 2:15 – 2:30 Break
- 2:30 – 3:00 Life Cycle Costing
- 3:00 – 3:30 Life Cycle Costing Workshop
- 3:30 – 4:00 Long-Term Funding
- 4:00 Evaluations, Wrap-Up, Adjourn

Southwest Environmental Finance Center

LEVEL OF SERVICE

Guidelines, Categories and Example Goals

Guidelines

The Level of Service Goals should define what your customers and employees can expect from the water utility. When customers understand what the utility is providing for them in terms of service and they are given a say in what the utility may provide in the future, they are more willing to pay. Customers need to understand that service is related to cost and typically the higher the level of service desired, the higher the costs associated with producing that level of service. Determining what the customer wants and is willing to pay for drives the decision making for the utility.

When defining your level of service goals, remember to write SMART goals – Specific, Measurable, Attainable, Realistic and Time Bound (when appropriate). This will allow the utility to track its performance, show successes and failures and revise for improvement each year. Goals can be changed or adjusted over time. Goals can also be added or removed from the list.

It's important to involve customers and staff in the process of establishing the goals or service levels. The goals can be either internal or external. External goals are those that directly impact the customers. Internal goals are those that are related to operations and that would not be easily understood by customers. Progress towards meeting the goals should be tracked and reported to upper management and the public.

Determining your Level of Service goals should not be overwhelming. Keep it simple; develop 10 – 12 goals around the most important aspects for your utility. The information below can be used as a resource in setting your utility's goals.

Categories

No matter where the water utility is located, customers desire roughly the same types of things from their utility – water that is safe and reliable, delivered at an adequate pressure, and that their concerns are addressed. Thankfully, this list is relatively small, allowing the utility to develop a targeted list of goals that address the major customer requirements. Level of Service Goals will typically fall into one of the following categories: Public Health and Safety, Customer Service, System Maintenance, Response Time, Water Loss

Risk - Hydrants

(Fire, Flush, Flow Test)

Probability of Failure

- Age
- Condition - rusting, corrosion, leaking seal?
- Frequency of Use - is it opened at least annually as part of a flushing or testing program?
- Routine maintenance completed?
- Pipe size connected to - less than 6 inch may cavitate
- Tools needed to open readily available to fire department and water department?

Consequence of Failure

- Inability to fight a fire - loss of property, loss of life
- Inability to properly flush system - health concerns
- Water damage to nearby structures
- Level of Service Failures

Asset: _____

Date: _____

Consequence (Cost) of Failure	**5**	*5*	*10*	*15*	*20*	*25*
	4	*4*	*8*	*12*	*16*	*20*
	3	*3*	*6*	*9*	*12*	*15*
	2	*2*	*4*	*6*	*8*	*10*
	1	*1*	*2*	*3*	*4*	*5*
Multiplied		**1**	**2**	**3**	**4**	**5**
		Probability of Failure				

1 Very Low	**2** Low	**3** Moderate	**4** High	**5** Very High

United States
Environmental Protection Agency

Preventive Maintenance for Small Public Water Systems Using Ground Water

An Interactive PDF with Suggested Preventive Maintenance Tasks and Logs

Introduction, System Information, Reference, and Contacts

Name:	
Date:	
Utility:	

Instructions:
Please input the water system's information in the green boxes. Please input the quantity and, where applicable, the size for each type of asset the utility owns. If the utility has recent unit price information for a specific type of asset listed below, that value can be input in the column labeled "Known Unit Price".

Orange Box: These are the calculated values

Gray Box: Unit Prices

Asset Type	Asset	Size	Quantity	Unit	Low Range Unit	High Range Unit	Median Range Unit	Known Unit Price:	Low Estimated Value	High Estimated Value	Median Value	Known Value:
Pipeline	Ductil Iron Pipe	4"-6"		per Linear Foot								$ -
		8"-10"										$ -
		12"-16"										$ -
		18"-24"										$ -
	Main PVC	4"-6"		per Linear Foot								$ -
		8"-12"										$ -
		14"-20"										$ -
	HDPE			per Linear Foot								$ -
	Service Line	.75"-2		Each								$ -
Valves	Blow Off	2"		Each								$ -
	Gate Valve			Each								$ -
	Air Release Valve	1"-2"		Each								$ -
	PRV	4"-8"		Each								$ -
	Check Valve			Each								$ -
Storage	Ground Storage			Gallons								$ -
	Elevated Storage			Gallons								$ -
	Steel Tank			Gallons								$ -
	Concrete Tank			Gallons								$ -
Hydrant	Fire Hydrant	4"-6"		Each								$ -
Meters	Supply Meters	4"-6"		Each	$ 700.00	$8,000.00	$ 1,500.00		$ -	$ -	$ -	$ -
	Customer Meters	.75"-2"		Each								$ -
Pumps	Submersible Pump	1\2 HP- 30 HP		Each								$ -
	Booster Pump	30 GPM-2000 GPM		Each								$ -
Treatment	Chemical Feed and Storage System			Each								$ -
							Estimated Value Range:		$ -	$ -	$ -	

Valuation Table | Sources

Intermediate Asset Management: Beyond the Basics

- Have you attended an introductory asset management workshop in the past? Have you read about asset management? Do you know the basics but not what to do next? If so, this workshop is for you. We will examine the next steps you can take in your asset management journey.
- **We will discuss:**
- - Techniques, tools, and examples for developing asset inventories and build maps
- - Setting and measuring level of service goals
- - Using data to generate probability of failure--such as pipe break data--which is the first part of
- criticality, and how to add consequences to the analysis
- - Developing a simple Capital Improvement Plan from existing data
- - Developing an asset valuation for your system
- While all attendees are welcome, this workshop is most suited for attendees who have some understanding of the basics of asset management.

Training Objectives:

- 1. Understanding how to develop enhanced water system maps that are more than asset location tools.
- 2. Understanding how mapping supports most aspects of an Asset Management Program including:
- a. capital improvement planning,
- b. water main replacement plans, and
- c. general operations and maintenance.
- 3. Understanding options for leveraging existing water system asset and event data (such as leaks & line breaks) to develop more comprehensive system maps
- 4. Demonstrating basic tools and considerations for developing or expanding a water system's mapping program

Typical Full-Day Agenda

- 9:00 - 9:30 Welcome and Introductions
- 9:30 - 10:00 Asset Management – A Brief Overview
- 10:00 - 10:30 Current State of the Asset - Inventory
- 10:30 - 10:45 *Break*
- 10:45 - 11:30 Current State of the Assets –Mapping
- 11:30 - 12:00 Mapping Workshop
- 12:00 - 1:00 Lunch
- 1:00 - 2:00 Level of Service – setting goals
- 2:00 - 2:30 Criticality – Probability and Consequence of Failure
- 2:30 - 2:45 *Break*
- 2:45 - 3:15 Funders presentations
- 3:15 - 4:00 Life Cycle Costing – Developing a CIP
- 4:00 - 4:15 Long Term Funding – Asset Valuation and Workshop
- 4:15 - 4:30 Wrap Up, Evaluations & Adjourn

Advanced Asset Management: Completing and Implementing Your Plan

- Has your system started, completed, or hired an expert to help with an asset management plan? If any of these situations apply to you, you might be asking: What's the next step? What kinds of benefits will I be able to achieve?
- This workshop is an opportunity for water systems that have progressed in asset management to share with each other and learn about how an asset management plan can be put into practice. The format of this workshop will be highly interactive and discussion-based.
- All attendees are welcome, but content will be most relevant for systems that have developed an asset management plan (either all or in part) or are implementing portions of asset management.

Water Loss Training

full day, sometimes paired with another topic

Includes any size or type of system

Presentations, workshops

Can be introductory or Advanced

Agenda

Water Auditing and Controlling Non-Revenue Water
Workshop for Small Drinking Water Systems
Location
Date

Agenda

8:30 – 8:45	Welcome and Introductions
8:45 – 9:30	Understanding the Water Balance and Introduction to Water Audit
9:30 – 10:15	Water Audit Software Demonstration: Introduction and Demonstration
10:15 -- 10:30	***Break***
10:30 – 11:30	Water Audit Workshop
11:30 – 12:00	State Regulatory or Funding Presentation, if applicable
12:00 – 1:00	***Lunch (On Your Own)***
1:00 – 1:30	Grading the Water Audit
1:30 – 2:15	Grading Workshop
2:15 – 2:30	***Break***
2:30 – 3:30	Addressing Non-Revenue Water
3:30 -4:15	Applying the Tool Box Workshop
4:15 – 4:30	Wrap Up, Evaluations, Adjourn

www.efcnetwork.com

Advanced focuses on the latter portion of the agenda: addressing non-revenue water loss

Workshop: Completing the Audit Data Entry

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Option 1: Very Small Utility

Water Loss Control Data Inputs Exercise

Water Supply

The Green Village Water Utility (GVWU) is a very small water utility located in the Southwestern United States. The GVWU services a rural area. Water is produced from 1 well that flows through a finished water meter (turbine style). GVWU buys no bulk water supply from any neighboring water authorities, nor does it sell water in bulk to any neighboring utilities. GVWU works on a fiscal year basis for financials and rate setting.

The water operator takes weekly readings of the master meter (production meters) and writes them by hand on a log sheet. At the end of the month, the operator sits down at the computer and enters the data into a spreadsheet. The spreadsheet calculates the total flow for the month. That value is entered into another spreadsheet that only includes the monthly total values. A copy of that spreadsheet is shown below.

Total Production for the Fiscal Year

Production Report for FY 16	Well #1 Meter (MG)
July 2015	1.12
August 2015	1.19
September 2015	0.99
October 2015	0.79
November 2015	0.68
December 2015	0.59
January 2016	0.56
February 2016	0.46
March 2016	0.63
April 2016	0.73
May 2016	0.96
June 2016	0.99
Total (MG)	**9.71**

GVWU has never checked their master meters for accuracy but they think they may not be accurate. They have recently attended a water loss training and heard that production meters should have some straight pipe before and after the master meter. The GVWU water meter was installed with a check valve right next to the meter and there is an elbow before and after the meter. They guess that the meter is overreading by 5%.

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Data Entry Summary

Input Type	Value or Write Default	Comments
Volume from Own Sources		
Master Meter and Supply Error Adjustment for Supply Master Meters		
Water Purchased/Bulk Water Imported		
Master Meter and Supply Error Adjustment for Bulk Water Imported		
Bulk Water Exported		
Master Meter and Supply Error Adjustment for Bulk Water Exported		
Billed Metered		
Billed Unmetered		
Unbilled Metered		
Unbilled Unmetered		
Unauthorized Usage		
Customer Meter Inaccuracies		
Data Handling Errors		
Length of Mains		
Location of Customer Meters		
Number of Active and Inactive Connections		
Average Operating Pressure		
Total Annual Cost of Operating Water System		
Customer Retail Unit Cost ($/1,000 Gallons)		
Variable Production Cost ($/MG)		

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Option 2: Medium-Sized Utility

Water Loss Control Data Inputs Exercise

Water Supply

The Town Water Utility (TWU) is a small-sized water utility located in the Southwestern United States. The TWU services both urban and rural areas within its county service area. Water is produced from 3 wells at separate locations around the system, and delivered through 3 separate finished water meters (turbine style). TWU buys no bulk water supply from any neighboring water authorities. TWU sells water in bulk to a neighboring utility (Waterville). TWU works on a fiscal year basis for financials and rate setting.

The water operator takes daily readings of the master meters (production meters) and writes them by hand on a log sheet. At the end of the month, the operator sits down at the computer and enters the data into a spreadsheet. The spreadsheet calculates the total flow for the month. That value is entered into another spreadsheet that only includes the monthly total values. A copy of that spreadsheet is shown below.

Total Production for the Fiscal Year

Production Report for FY 16	Well #1 Meter (MG)	Well #2 Meter (MG)	Well #3 Meter (MG)	Total
July 2015	24.68	20.40	11.22	56.30
August 2015	26.14	21.60	11.88	59.62
September 2015	21.78	18.00	9.90	49.68
October 2015	17.42	14.40	7.92	39.74
November 2015	14.52	12.00	6.60	33.12
December 2015	13.07	10.80	5.94	29.81
January 2016	12.36	10.20	5.61	28.17
February 2016	10.16	8.40	4.62	23.18
March 2016	13.79	11.40	6.27	31.46
April 2016	15.97	13.20	7.26	36.43
May 2016	21.05	17.40	9.57	48.02
June 2016	21.78	18.00	9.90	49.68
Total (MG)	**212.72**	**175.80**	**96.69**	**485.21**

TWU went to a water loss training last year and learned that they should check their master meters (also called production meters) for accuracy. They included some funding in the budget for FY 16 to check the meters. This was the first time they had checked the meters. The results of the tests are shown on the table below.

Workshop: Determining Audit Data Grades

AWWA Free Water Audit Software Grading Matrix

The tables listed on the following pages reproduce the data grading criteria for each input in the AWWA Water Audit Software Reporting Worksheet.

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 right:

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.

Please note that, for some inputs you will have the option to choose a default value, which will automatically be assigned a data grade of 5.

Adapted from the AWWA Water Audit Software ver. 5.0 by the:

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Centennial Engineering Center – Suite 3020
Department of Civil Engineering MSC01 1070
1 University of New Mexico, Albuquerque, NM 87131
505-277-0644 joefs@unm.edu
http://southwestefc.unm.edu

Version: 01-09-18

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Data Grading Summary

Input Type	Data Grade (Not Needed if Default)	Comments
Volume from Own Sources		
Master Meter and Supply Error Adjustment for Supply Master Meters		
Water Purchased/Bulk Water Imported		
Master Meter and Supply Error Adjustment for Bulk Water Imported		
Bulk Water Exported		
Master Meter and Supply Error Adjustment for Bulk Water Exported		
Billed Metered		
Billed Unmetered		
Unbilled Metered		
Unbilled Unmetered		
Unauthorized Usage		
Customer Meter Inaccuracies		
Data Handling Errors		
Length of Mains		
Location of Customer Meters		
Number of Active and Inactive Connections		
Average Operating Pressure		
Total Annual Cost of Operating Water System		
Customer Retail Unit Cost ($/1,000 Gallons)		
Variable Production Cost ($/MG)		

Last edited: 6/2018

2

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

Workshop: Applying the Toolkit

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
Real Losses: Overflows and Leakage on Storage Tanks	19 – Tank Management, Data Collection, & Inspection	Low

TOOLS FOR TYPES OF PIPE LOSSES

The Toolbox (Basic)	Type of Real Loss Addressed	Cost Range
11 – Collecting & Analyzing Break Data	Reported Leaks	Low
12 - Improve speed/quality of repairs	Hidden Leaks, Reported Leaks	Low
13 - Locate & eliminate pressure transients (surges, water hammer)	Unavoidable Leaks, Hidden Leaks, Reported Leaks	Low-Mid
14 – Night Flow Analysis	Unavoidable Leaks, Hidden Leaks	Mid
15 - Reduce peak and overall pressure	Unavoidable Leaks, Hidden Leaks, Reported Leaks	Mid-High
16 – Main Replacement	Unavoidable Leaks, Hidden Leaks, Reported Leaks	High
17 – Service Replacement	Hidden Leaks, Reported Leaks	Mid - High
18 - Acoustic leak survey	Hidden Leaks	Mid

Outcomes/Potential Outcomes

Utilities have chosen to conduct water audits who have never done so before

Utilities who have done water audits in the past have received information to improve those water audits

Utilities have improved their data grading techniques and have received

Utilities have a better understanding of the types of activities they can undertake to reduce non-revenue water

Regionalization Training

½ day or full day (more are half day)

Includes any size system (one training included a system that just met the requirement up to one of the largest community systems in the U.S.)

Presentations, discussion, case studies, small group discussion

Agenda

Smart Management for Small Water Systems

The Power of Partnership: Sharing Resources with Neighboring Systems

Date
Location

Presented by: Trainer from the Environmental Finance Center Network

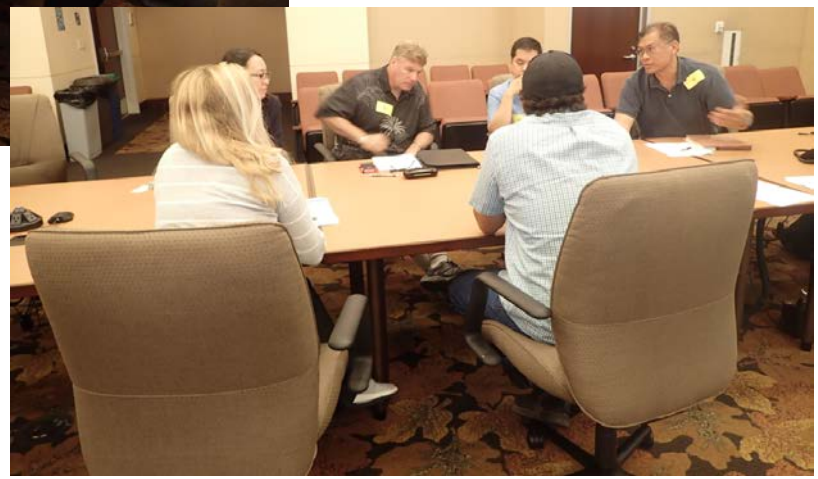
Agenda

8:30 – 8:45	Welcome & Introductions
8:45 – 9:15	What are Partnerships? Why might I be interested?
9:15 – 9:45	Partnership Examples
9:45 – 10:15	Case Study Example
10:15 – 10:30	Break
10:30 – 10:45	What are the Biggest Partnership Needs/Interests?
10:45 – 11:30	Small Group Discussions: What Type of Collaboration Would be Beneficial to Address Needs/Interest?
11:30 – 12:00	Resources Available, Including Funding Resources
12:00	Wrap-up & Adjourn

www.efcnetwork.com

Workshops

Small Group Discussion around issues they would like to solve



Outcomes/Potential Outcomes

Two utilities met up at training and determined they could join up into one utility

Utilities agree to reestablish a monthly meeting

Utilities agree to meet up in the future for continued discussion

Utilities are open to additional ways to partner

Resilience

Preparing small water systems for an uncertain future

UNIVERSITY OF 18 56 MARYLAND

ENVIRONMENTAL FINANCE CENTER

Objectives

- Now more than ever, water utilities must learn to be resilient in the face of an uncertain future. At this workshop, we discuss potential threats in your region, including extreme weather and climate disruptions, and give you tools to identify risks, assess vulnerabilities, and plan for impacts.

- Participants will then put their new knowledge to the test in an interactive exercise. During this exercise attendees will work together to asses a hazard situation, prioritize needs, and plan for and implement actions strategies in order to manage threats.

- Finally, we will learn about local resources including funding opportunities that can help turn your plans into action.

In this workshop, attendees will learn:

- How to identify threats to small water systems and their impacts and consequences;
- How to plan for and mitigate against climate change risks; and,
- How to access local resources.

Typical Agenda

Standard

Introduction to Resilience

- What is resilience?
- The Hard Sell- Catastrophe Tour
- 4 R's of Resilience

Local Trends in Risks

- Heat
- Precipitation
- Sea-level
- Pests/Agriculture

Planning

- Safe & Sure
  - Threat - Mitigation
  - System - Adaptation
  - Service - Coping
  - Consequences- Learning
- Climate Ready Water Utilities Tool
  - Resilience Strategies

Interactive Session

Local Resources, Tools, & Funding

Customized Topics

- Regionalization/Collaboration
- Sustainable Management
- Emergency Management
- Vulnerability Assessments

Exercises

PESTLE

- Scenario
- Locally Specific
- Discussion Based

GAME OF FLOODS

- Scenario/Simulation
- Role Play Table Top Game
- Risk & Vulnerability Assessment
- Prioritization and Negotiation Based

EMERGENCY WATER SUPPLY & DEMAND SIMULATION

- Scenario
- Water Systems Specific
- Emergency management planning
- Workbook/exercise based

Who we have worked with

gauging future interest from past experience

Maine - 2017

- New England
- 3 Attendees (managers/operators)
- Resilience/Planning
- PESTLE

Rhode Island - 2017

- New England
- 9 Attendees (managers/operators)
- Resilience/Regionalization
- PESTLE/ Informal Discussions

Delaware - 2018

- SERCAP
- 8 Attendees (managers, state/local reps, ngo)
- Resilience/Sustainable Management
- GAME OF FLOODS

Kansas – 2018

- Wichita
- TBD Attendees
- Resilience/ Emergency Management
- EMERGECY WATER SUPPLY & DEMAND EXCERCISE

Rhode Island – 2018

- New England
- TBD Attendees
- Resilience/ Vulnerability Assessment
- GAME OF FLOODS

Leadership Training

1½ day or full day

Includes any size system

Presentations followed by activities and exercises and small group discussion

Agenda Items

Root Cause Analysis & Decision Making

Strategic Planning (Includes Wind Tunnel, Futures Development and SWOT)

Conversation Mapping to Access Stakeholder Knowledge

Active Listening

Personality Assessment

Using Story for Impact

Effective Messaging

Powerful Presentations

Workshops

Multiple tools to take home

Outcomes/Potential Outcomes

Participants should:

Understand key decision-making techniques to better understand root cause and potential opportunities

Be able to strategically plan for potential futures

Learn how to access and use stakeholder knowledge

Recognize how to better manage themselves, understand others and listen more attentively

Appreciate the importance of effective messaging and presentation using photographs, video and story

Workforce Planning

Roughly a 6 hour training

Can include any size system

Presentations followed by activities and exercises and small group discussion

Agenda

Telling the Water Story—Messaging

- Messaging Basics: talking up the industry
- Benefits of Working in Water
- Outreach Opportunities and Techniques

Recruitment

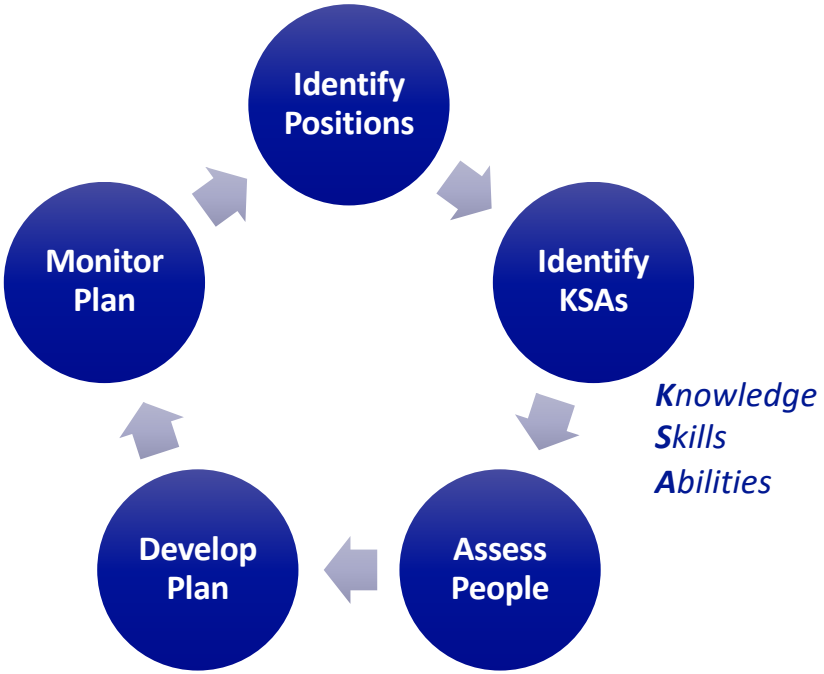
- Creating interest in water careers
- How to find good employees
- Where to look

Retention

- Talent Development, Compensation, Evaluation, training
- Workplace culture & environment
- Knowledge transfer

Succession Planning

- Effective board communication and utility management support
- What KSAs do you have today, what will you need tomorrow, and what's the gap?
- Developing the succession plan



Exercises

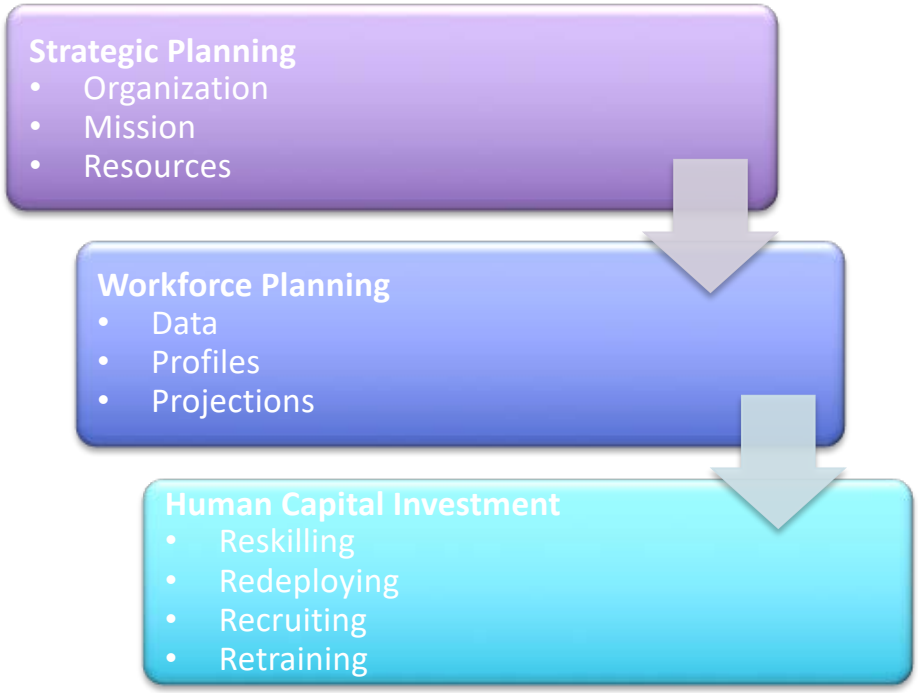
Round the Room: How did you get into "water work"? Purposeful or no?

Exercise: Workforce Planning Self-test

Exercise: Developing a Message; "selling your system"

Exercise: Targeting candidate pools

Exercise: Write a job description (a paragraph describing job, a list of skill sets necessary, experience and education); and name 5 places to post



Outcomes

Participants should:

- Understand how to positively communicate about water careers
- Be able to develop job descriptions and reach specific audiences for recruitment
- Have the tools necessary to create/maintain a healthy workplace culture and invest in existing staff
- Understand the importance and steps to develop a Succession Plan

Technical Assistance

Kansas Rural Water District #5

- Reimagined and revised job description
- Interview training tools for board members
- Sample interview questions

Blencoe, Iowa

- Developed performance evaluations
- Salary & raises comparison report

We can help you develop:

- Succession plans
- Job descriptions or postings
- Compensation reports
- Public outreach campaigns
- Employee engagement plans
- Employee evaluation tools
- Workforce gap analysis
- Policies
- Educational programs
- Customer communication plans
- And more – just call!

Other Training Topics

Smart Management for
Small Water Systems