

This presentation premiered at WaterSmart Innovations

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Water Loss Control in the Great Lakes Region

General Methodology, Unique Challenges



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October 6, 2016

WaterSmart Innovations

Hey there!



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Agenda

Evaluating

and

Intervening

against

Water Losses

in

The GREAT LAKES Region

Case Studies



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*Seeking New Ways to Solve Community-Scale Water
Management Challenges in the Great Lakes Region*

1. Case Study of Water Auditing and Component Analysis
2. Region-Wide Outreach and Education

Benefits of Water Loss Control

save water

reduce costs

be proactive

better information → better system management

Water Loss Control

1

Determine Loss Volumes

- AWWA water audit
- Apparent & Real Loss volumes

2

Distinguish Types of Leakage

- breakdown of types of leakage
- sources of Apparent Loss

3

Evaluate Economics

- costs of losses
- costs of intervention strategies

4

Implement Interventions

- leak detection
- repair time improvement
- pressure management
- cost effective!

Water Auditing

1. Systematically account for known water volumes to estimate volumes of **Water Loss**.
2. Evaluate **data source reliability**.
3. **Communicate** water distribution efficiency.

Water Auditing

Account for volumes...

WATER SUPPLIED	AUTHORIZED CONSUMPTION	BILLED AUTHORIZED CONSUMPTION	BILLED METERED CONSUMPTION	REVENUE WATER
			BILLED UNMETERED CONSUMPTION	
		UNBILLED AUTHORIZED CONSUMPTION	UNBILLED METERED CONSUMPTION	\$\$\$
			UNBILLED UNMETERED CONSUMPTION	
	WATER LOSSES	\$\$\$ APPARENT LOSSES	CUSTOMER METER INACCURACIES	NONREVENUE WATER
			UNAUTHORIZED CONSUMPTION	
\$\$\$ REAL LOSSES		DATA HANDLING ERRORS	💧	

- *Mass balance – process of elimination*
- *Account for all water*
- *Accuracy matters!*

Water Auditing

...Estimate volumes of Water Loss!

Apparent Losses



Real Losses



Why Component Analysis?

*Different types of leakage
should be addressed
with different intervention strategies!*



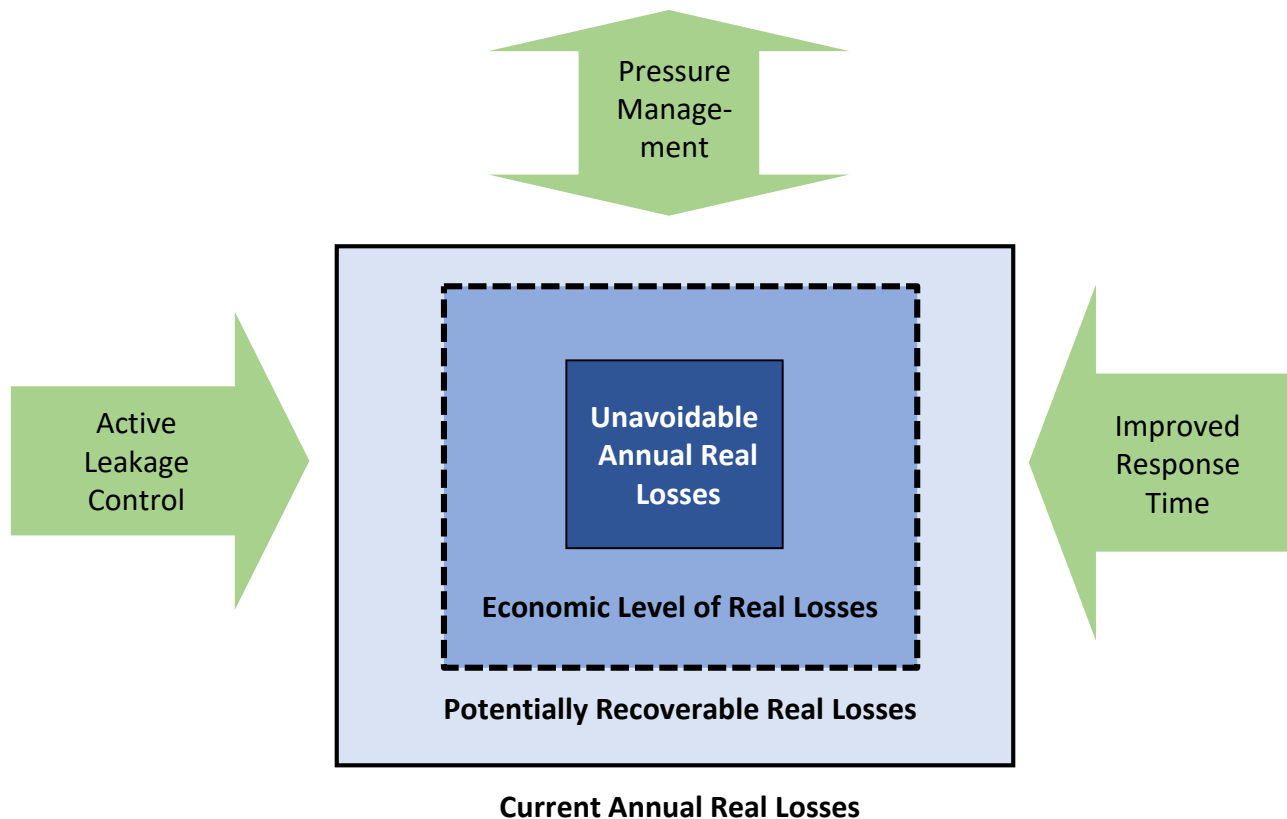
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(eureka!)

Why Component Analysis?

Knowing your leakage profile enables you to *cost-effectively* manage the leakage in your system



Case Studies

Madison Water Utility

Madison, WI

- 65,000 service connections
- 940 miles of main
- 22 wells
- Full-system AMI
- 10 pressure zones

Calendar year 2014

City of Ann Arbor

Ann Arbor, MI

- 25,000 service connections
- 480 miles of main
- 85% river water, 15% wells
- Single treatment plant
- 5 pressure zones

Fiscal year 2014-2015

Water Audit Results

RESULT	MADISON	ANN ARBOR
Water Losses (gal/conn/day)	96	51
Water Losses (\$)	\$1,400,000	\$460,000
ILI	4.1	1.9
Data Validity Score	54	59

Commonalities:

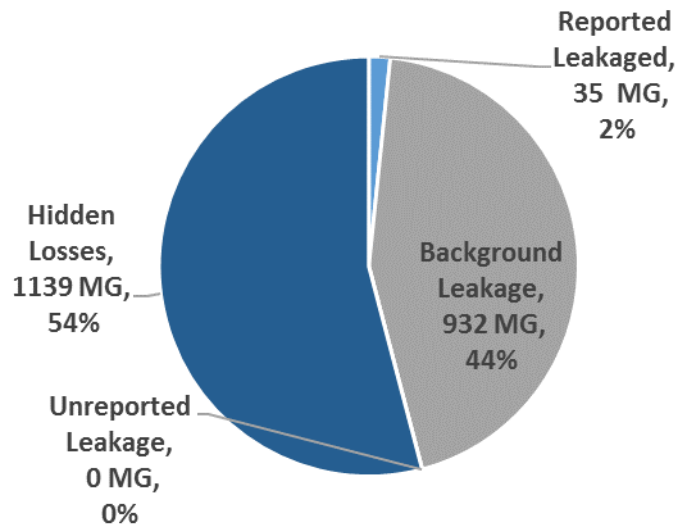
A few sales meters register a lot of volume

Production meter accuracy information not available

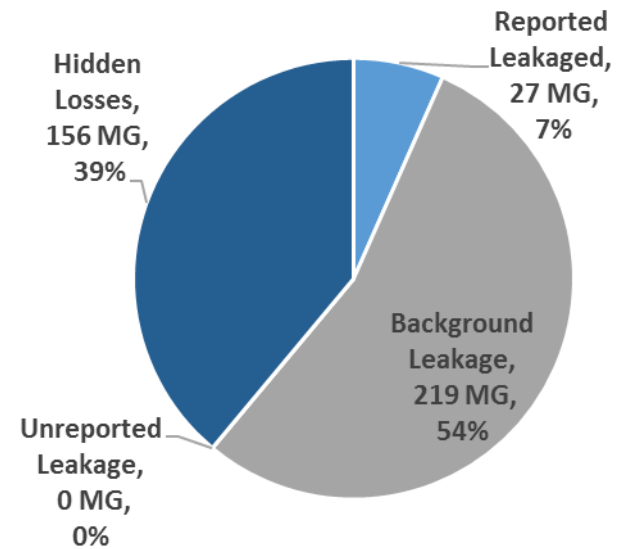
Customer meter accuracy information not available

Component Analysis Results

Madison Water Utility



City of Ann Arbor



Commonalities:

Reported leakage is small portion of total leakage

Repair records were usable, though some uncertainty persists

Axes of Water Loss Control



Recommendations

Madison Water Utility

City of Ann Arbor

Consider pilot leak **detection**

Monitor leakage volume

Consider zonal management of leakage

Collect meter accuracy information
(production meters and customer meters)

Perform another water audit and Component Analysis of Real Losses

Takeaways

Data doesn't have to be perfect to be insightful!

The water audit may suggest that you should intervene against water losses or that you should monitor water losses instead – but **you can't know until you investigate.**

You **need a Component Analysis of Real Losses** to plan water loss control.

Your results and action plan are unique to your system – there is **no “one size fits all” approach** to water loss control.

Regional Applications

The **water loss control perspective** can inform infrastructure renewal decisions.

Efficient water distribution **benefits the ratepayer** and promotes equitable revenue generation.

An established water loss baseline can **prove the success** of management and infrastructure improvements.

Regional water management information can encourage **informed resource stewardship**.

Regional Applications

The Great Lakes region can benefit from **training and initial technical support** in water loss assessment.

Though the region faces unique challenges, water loss control methodology is both **applicable and beneficial!**