

Delaware River Basin Commission

DRBC Water Demand Management: Promoting Best Practices

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Photo: David B. Soete



Delaware River Basin Commission

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DRBC Water Demand Management: Promoting Best Practices

Today's talk will cover...

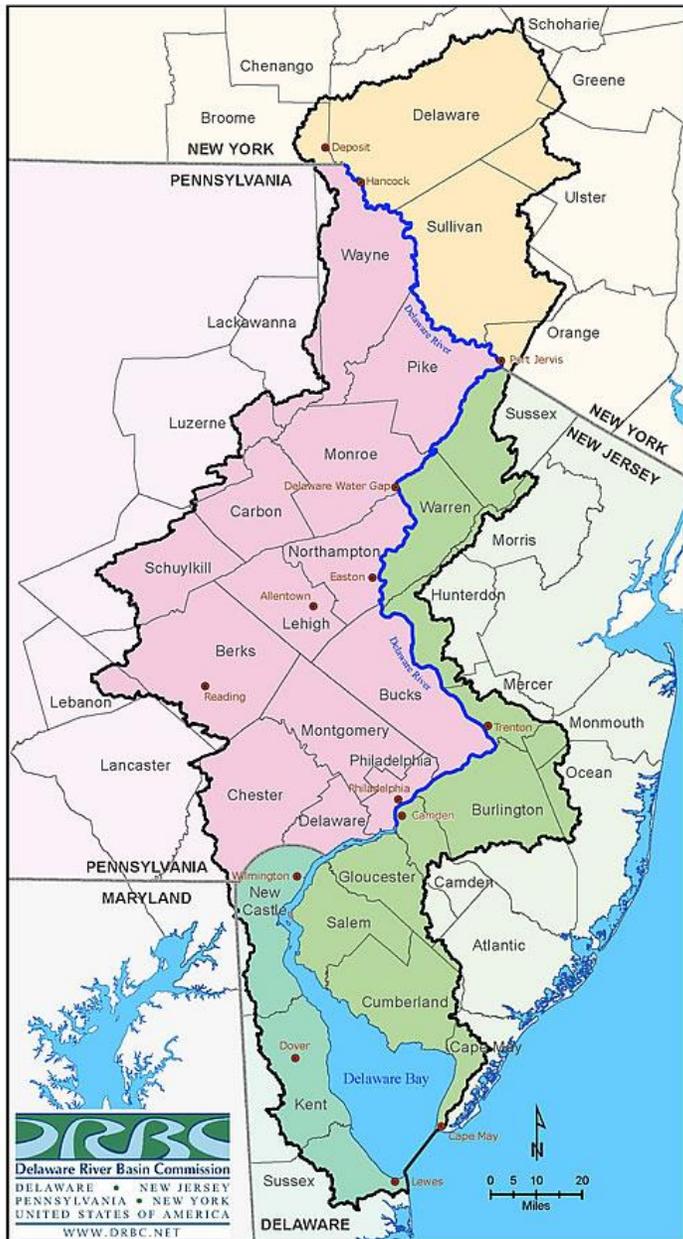
- History of DRBC demand management programs
- Current water use and trends in the Delaware River Basin
- DRBC Water Audit Program and results from CY2016 Audits
- Co-Authors:
 - Chad Pindar, P.E., Manager of Water Resource Planning
 - Doug Rowland, former Water Resource Scientist

“A river is more than an amenity, it is a treasure”

-US Supreme Court Justice
Oliver Wendell Holmes

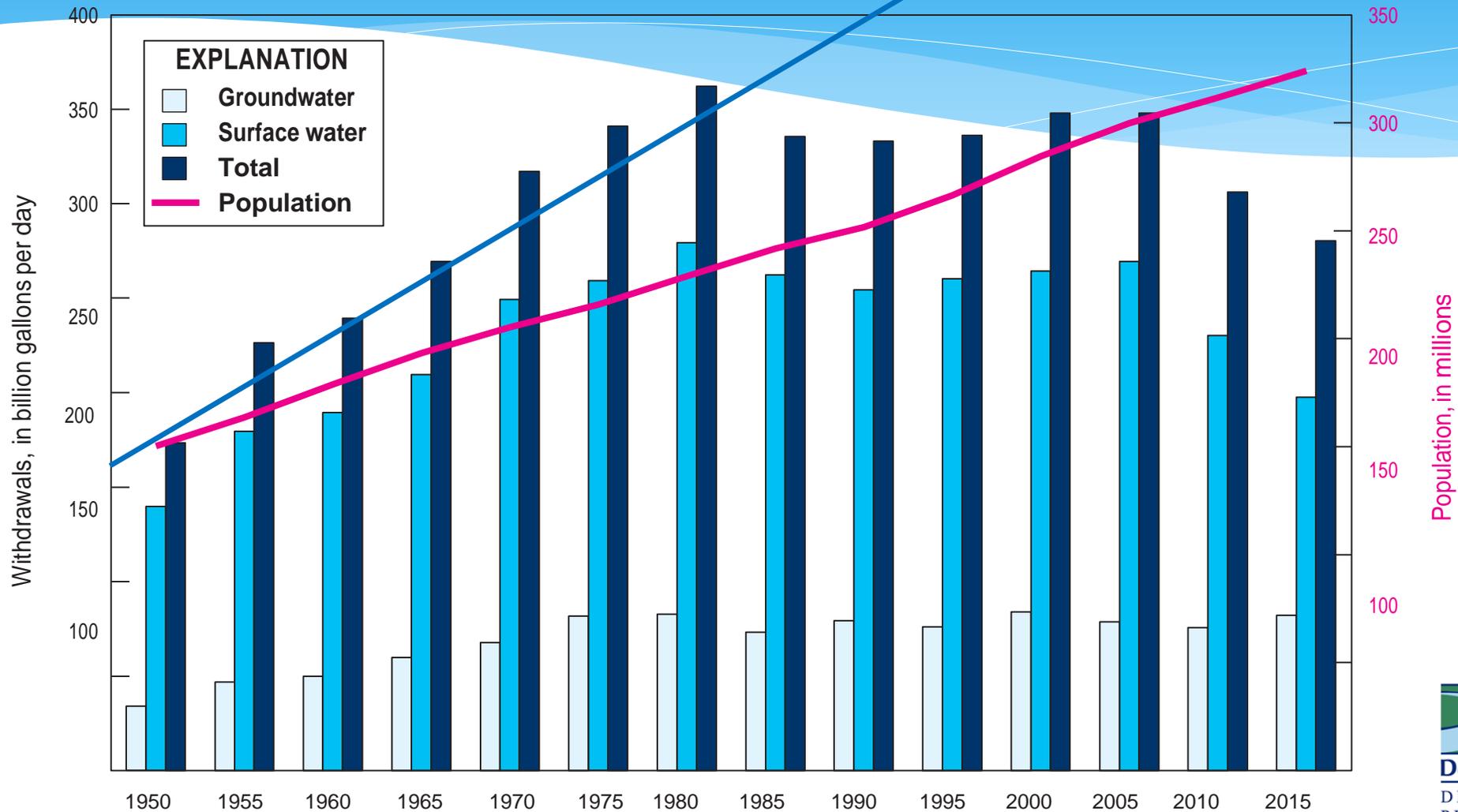
Fast Facts:

- Delaware River Main stem river is **330 miles long**
- Delaware River forms an interstate boundary over its entire length
- **~15 million people** (about 5% of the U.S. population) rely on the waters of the Delaware River Basin
- **Drains 13,539 square miles** of watershed in 4 states.
- Water **withdrawal** in the Basin = **6.6 billion gallons a day**
- **Significant Exports: NYC (up to 800 MGD) and NJ (up to 100 MGD)**
- Longest, un-dammed U.S. river east of the Mississippi (dams are located on tributaries, not the main stem Delaware)
- **Contributes over \$21B in economic value** to the Region.



US Water Use & Population 1950 – 2015

Trends in Water Use, 1950–2015



USGS, 2018, Estimated Use of Water in the United States in 2015



Damming the Delaware*

1954 – Supreme Court Decree apportioning diversions to NYC and NJ from the Delaware River Basin while requiring downstream releases to NJ, PA and DE

1961 – DRBC formed to facilitate and regulate water resources

1961-67 – Drought of the 60s

1960's Tocks Island Dam Design: Water Supply, Flood Control, Power and Recreation – 105 BG Storage

1975 – DRBC Governors vote against Dam 3:1

1978 – Middle Delaware designated under Wild & Scenic Act

1978 – PA threatens to return to Supreme Court

1980s – Good Faith Agreement



**Damming the Delaware: The Rise and Fall of Tocks Island Dam* by Richard C. Albert, 2nd Edition, PSU Press, 2005

DRBC Conservation Regulation History

- 1976:** Program to **REDUCE WATER USE IN BASIN**
- 1981:** Information on water conserving devices and procedures
- 1983:** Depletive Use reduction during drought
- 1986:** Source & Service Metering
- 1987:** Leak Detection & Repair
- 1988:** Conservation Plumbing Standards
- 1992:** Water Conservation Pricing
- 2009:** Water Loss Accountability (Water Audit) Rule
 - * One of only a few in the US
- 2012:** First year for use of water audit (AWWA format)

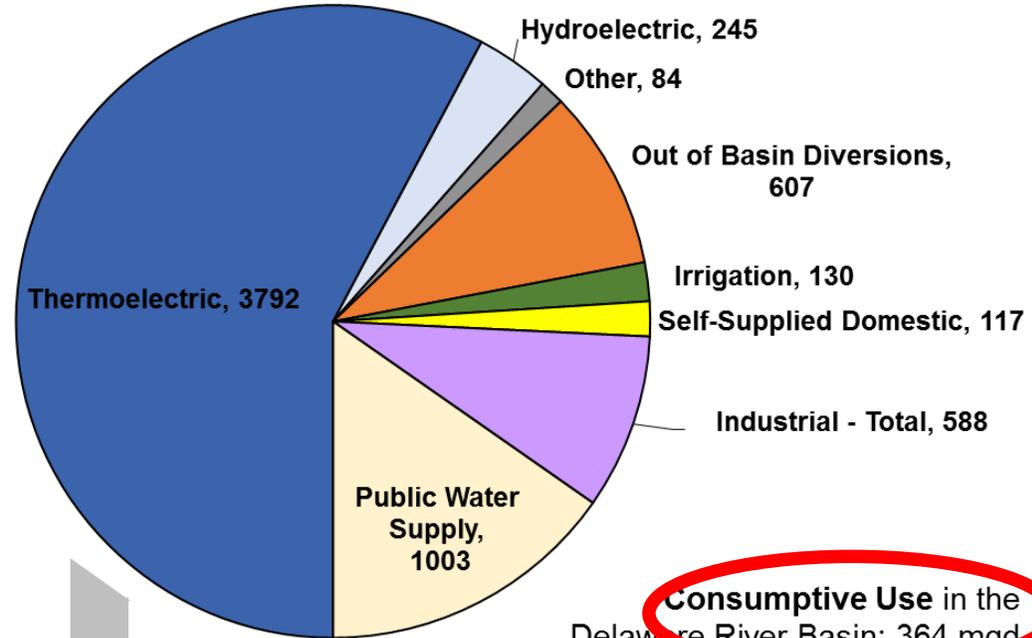
Water Loss Accounting: DRBC Water Audit Program

The purpose of DRBC's water audit program is to track how efficiently water is moved from its source to the customer (within a public water system) and to ensure that systems quantify and are accountable for water losses.

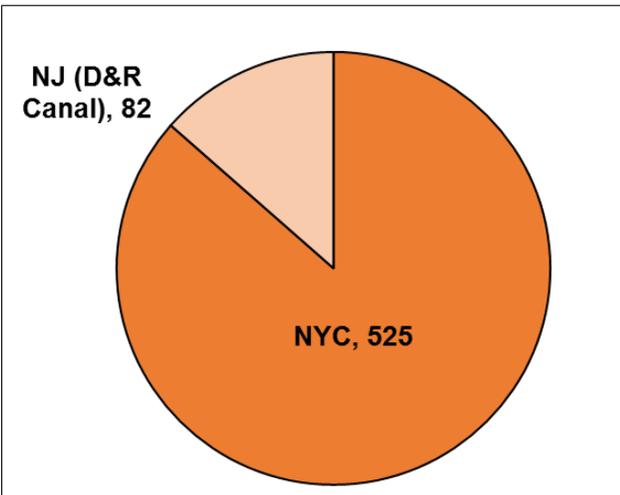
DRB Current Public Water Use and Trends

Total Water Withdrawals (ground and surface) from the Delaware River Basin, **2016: 6,565 mgd**

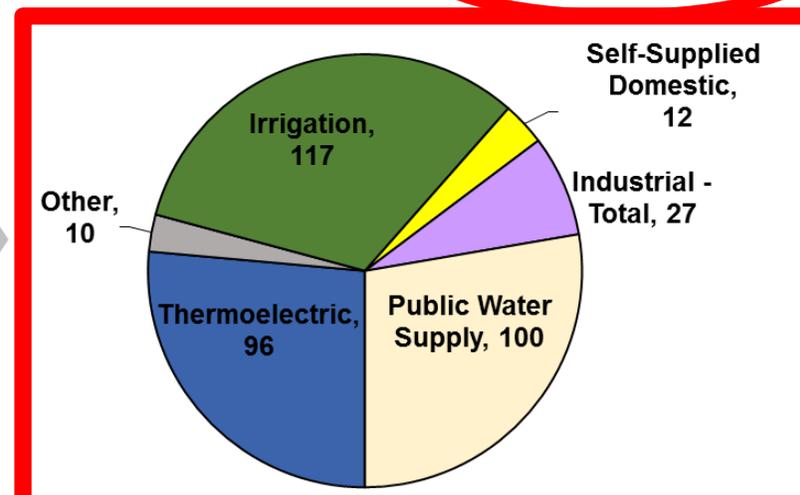
- Thermoelectric
- Hydroelectric
- Other
- Out of Basin Diversions
- Irrigation
- Self-Supplied Domestic
- Industrial - Total
- Public Water Supply



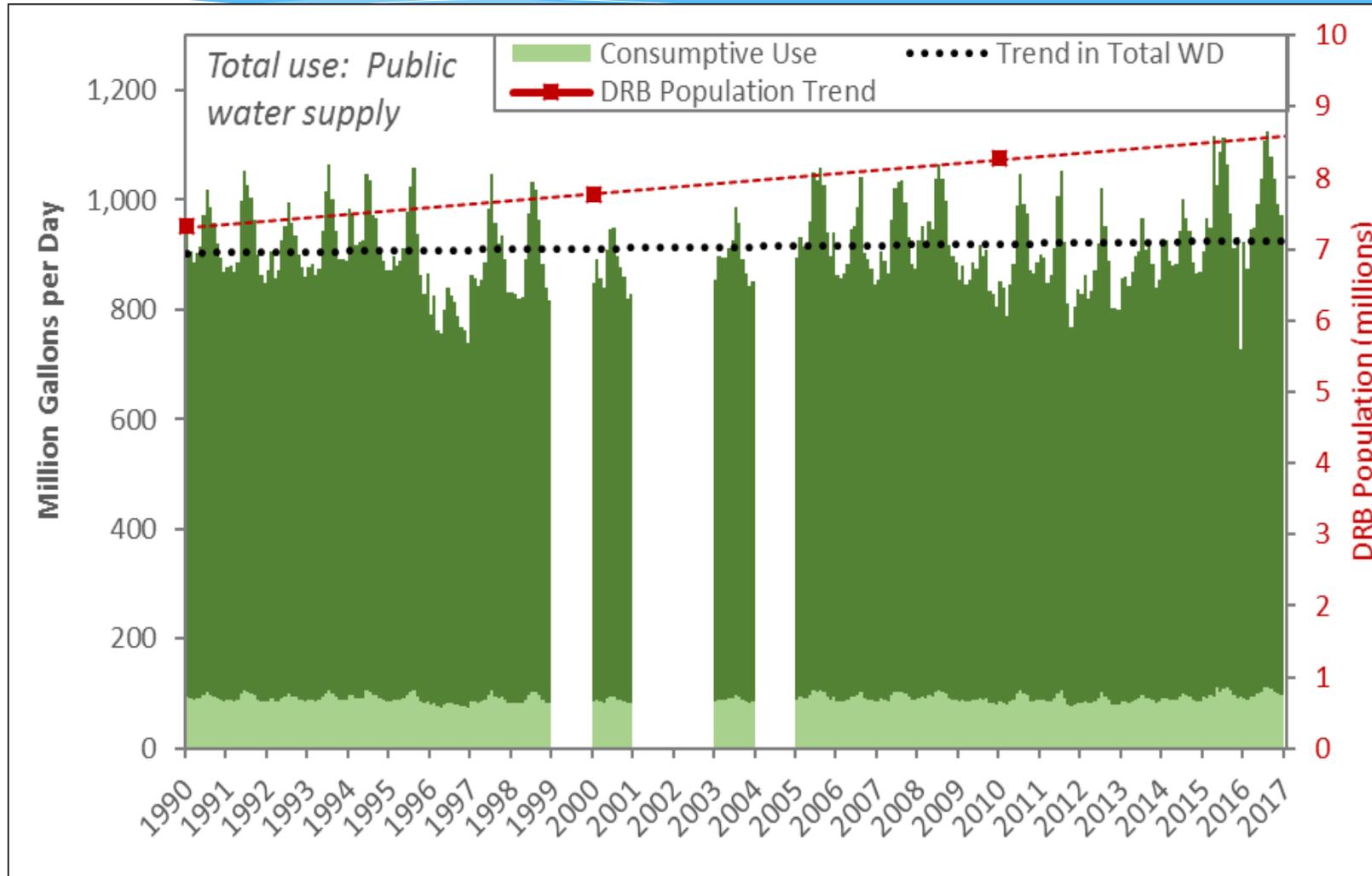
Major Exports from the Delaware River Basin: 607 mgd



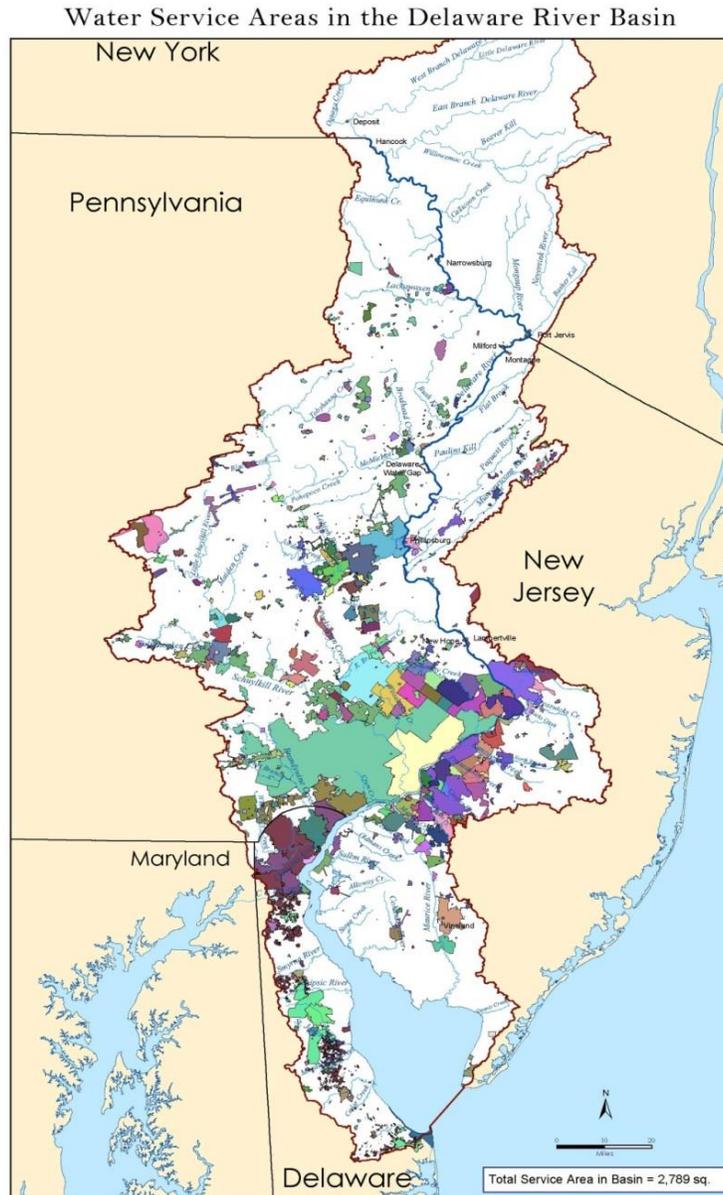
Consumptive Use in the Delaware River Basin: 364 mgd



Monthly withdrawals of Public Water Systems in the Basin 1990-2016



Public Water Supply Service Area in the Delaware River Basin



- Total PWS withdrawals:
~1.0 BGD (2016 data)
- 2nd largest water use sector in the Basin
- Approx. 21% of Basin covered by service area
- Serve 6.7 million customers (80% of basin residents)
- Approx. 300 systems subject to Water Audit Requirement

DRBC Rule change

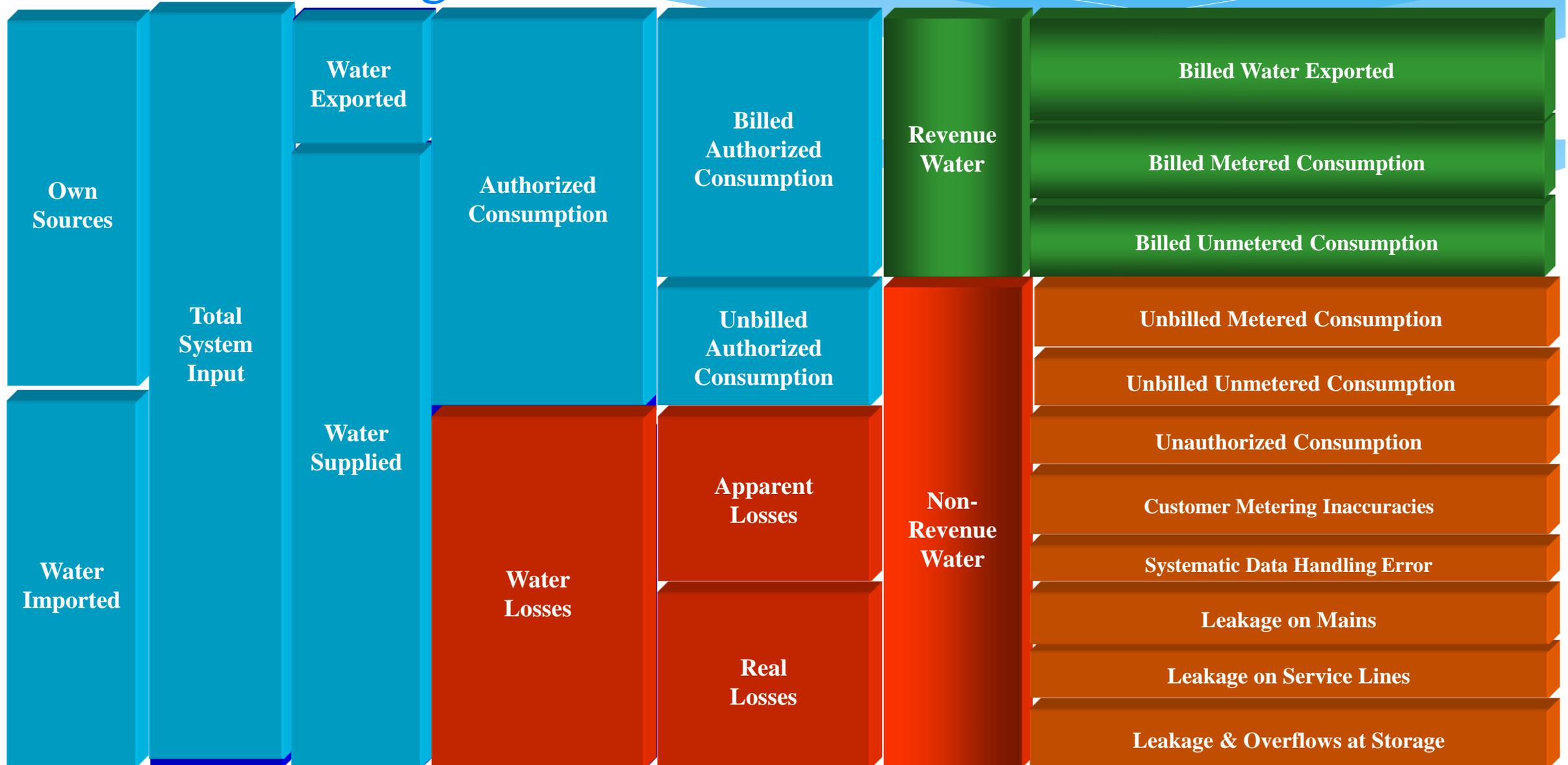
~~Unaccounted for water (UFW)~~

IWA/AWWA Water Audit
Methodology



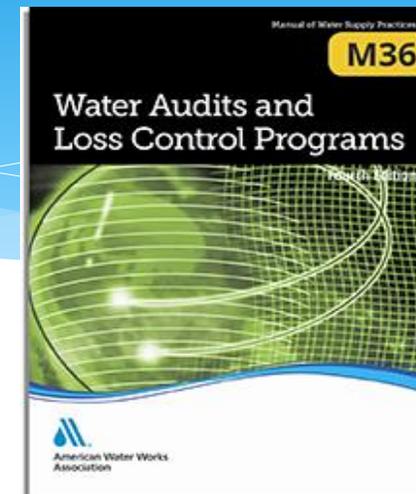
IWA/AWWA Water Audit Components

www.awwa.org



AWWA Resources / Software

- M36 Water Audit manual
- Free interactive audit software available
- DRBC provided a key role in software design and development
- Data grading capability assesses the validity of the input data
- Instructions, definitions provided in software



www.awwa.org

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

Water Audit Report for: **Philadelphia Water Department**
 Reporting Year: **2013** | 1/2013 - 12/2013

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 (na 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

Volume from own sources	7	87,417.500	MG/Yr	10	1,304,420	MG/Yr
Water imported	na	0.000	MG/Yr	10	0	MG/Yr
Water exported	10	5,402.000	MG/Yr	10	-82,580	MG/Yr
WATER SUPPLIED:		80,628.500	MG/Yr			

AUTHORIZED CONSUMPTION

Billed metered	7	49,907.000	MG/Yr	10	1,959,000	MG/Yr
Billed unmetered	na	0.000	MG/Yr	10	0	MG/Yr
Unbilled metered	na	0.000	MG/Yr	10	0	MG/Yr
Unbilled unmetered	8	1,959.000	MG/Yr	10	0	MG/Yr
AUTHORIZED CONSUMPTION:		51,866.000	MG/Yr			

Unbilled Unmetered volume entered is greater than the recommended default value

WATER LOSSES (Water Supplied - Authorized Consumption) **28,762.500** MG/Yr

Apparent Losses

Unauthorized consumption:	8	2,425.500	MG/Yr	10	2,425.500	MG/Yr
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Unauthorized consumption volume entered is greater than the recommended default value

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

How to Assess Water Loss and Its Impacts

Three “V”s...

Volume

MG per Year
Gal/connection/day
Infrastructure Leakage Index

Value

\$ per Year
Economic Loss
Real and Apparent

Validity

Data Input Grading
Water Audit Data Validity
Score

Water Audit Data Analysis: CY2016 Results for the Delaware River Basin...

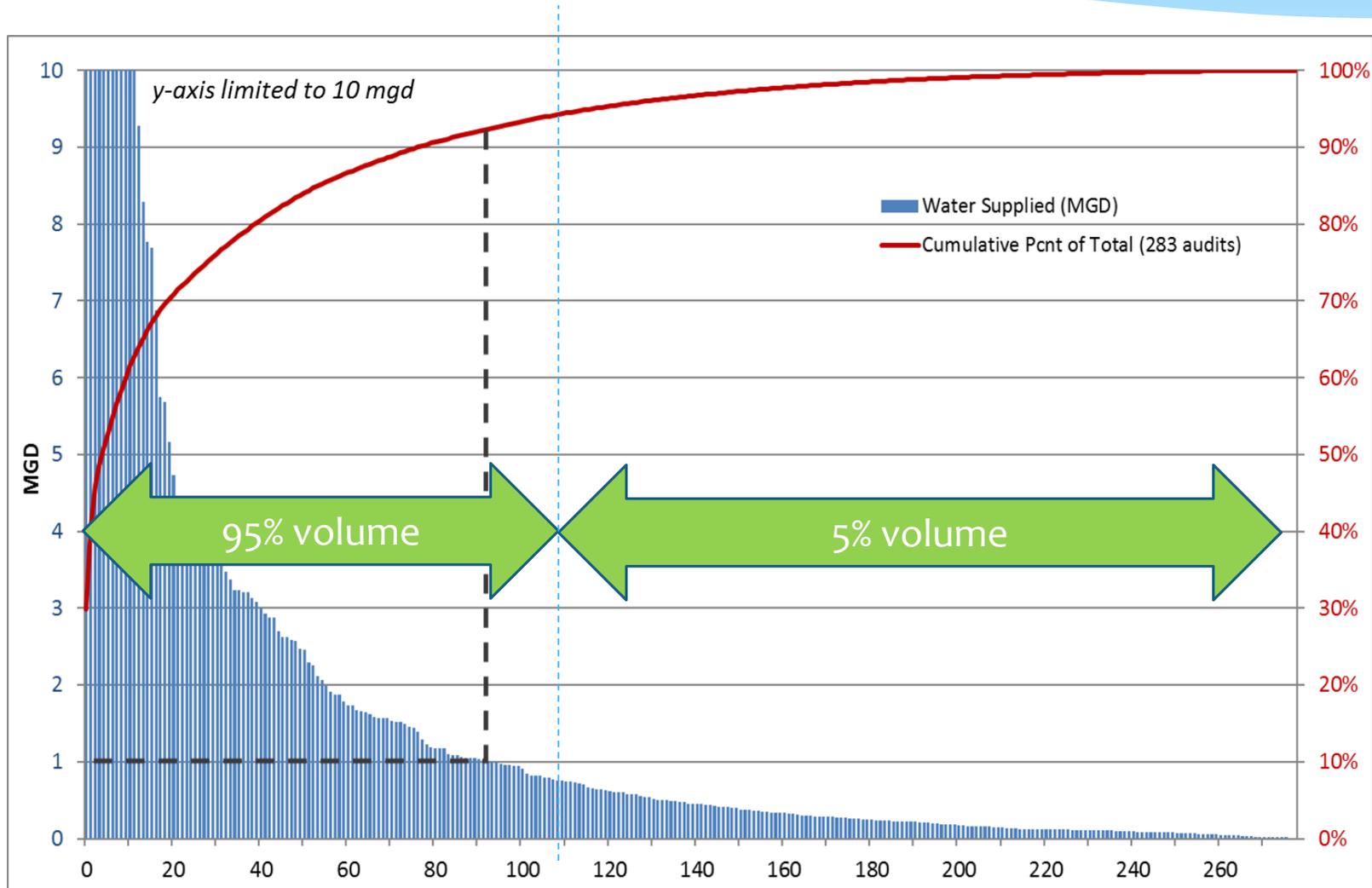




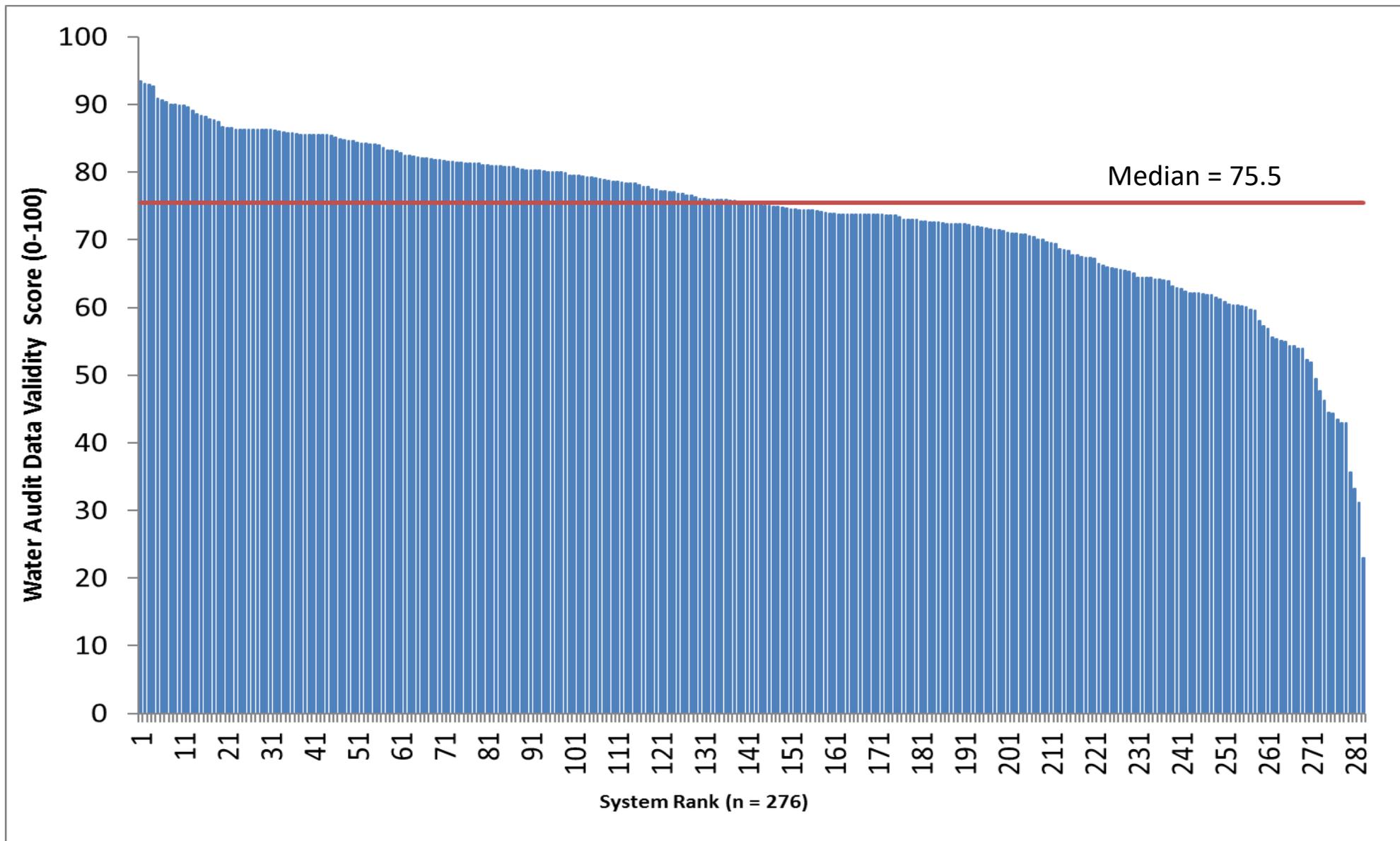
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Water Supplied in CY2016 (MGD) - DRB



Water Audit Data Validity Score CY2016 - DRB

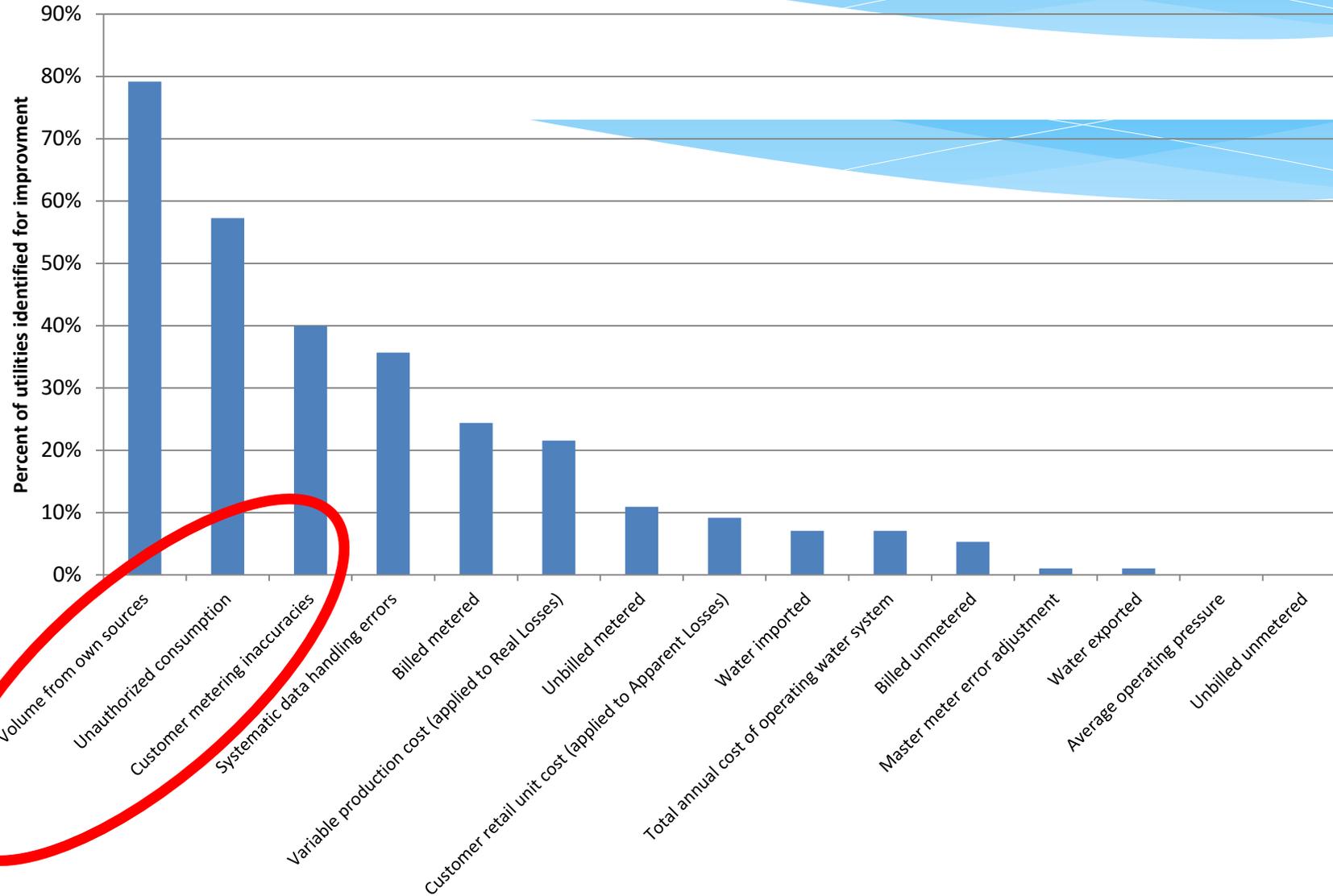




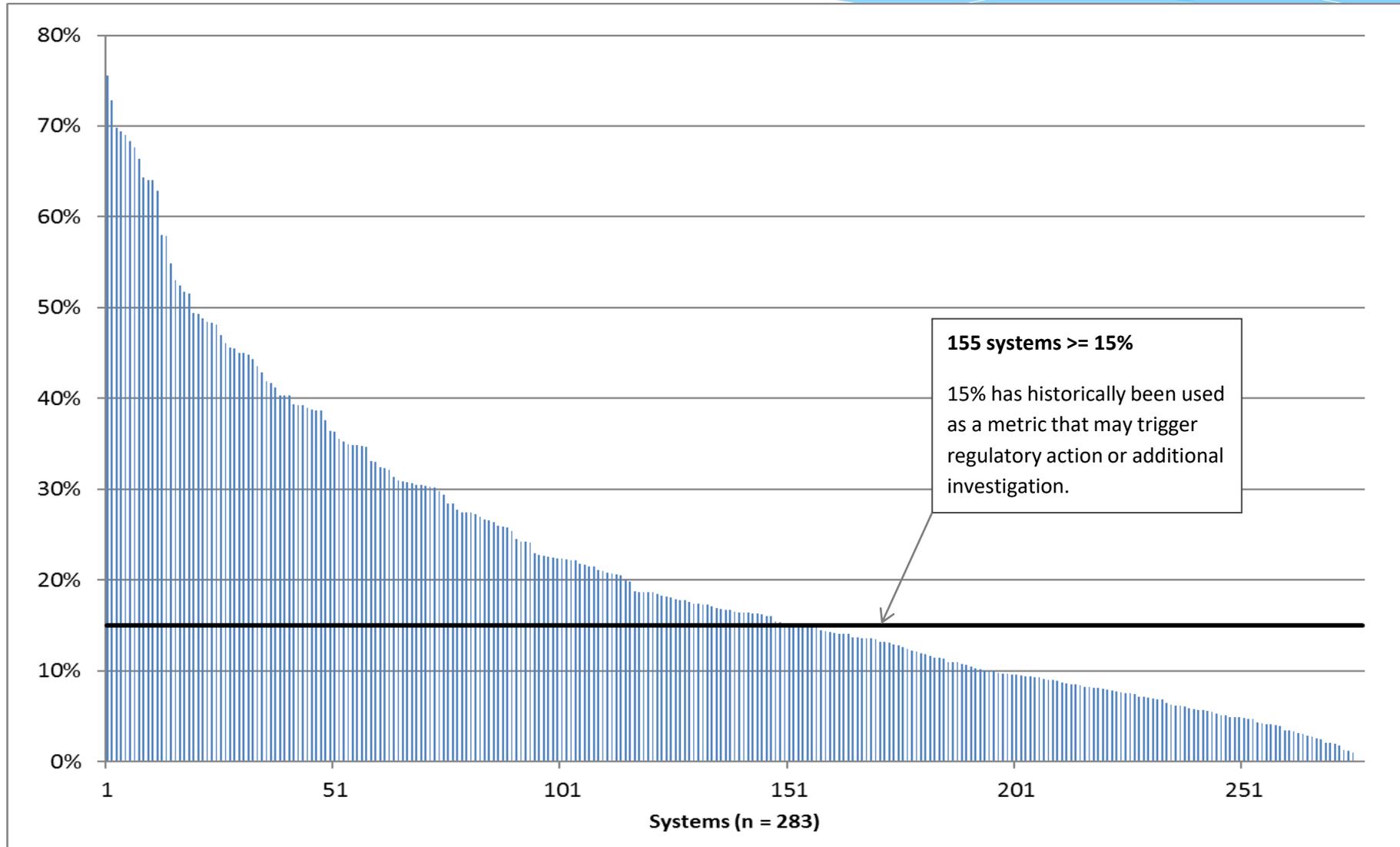
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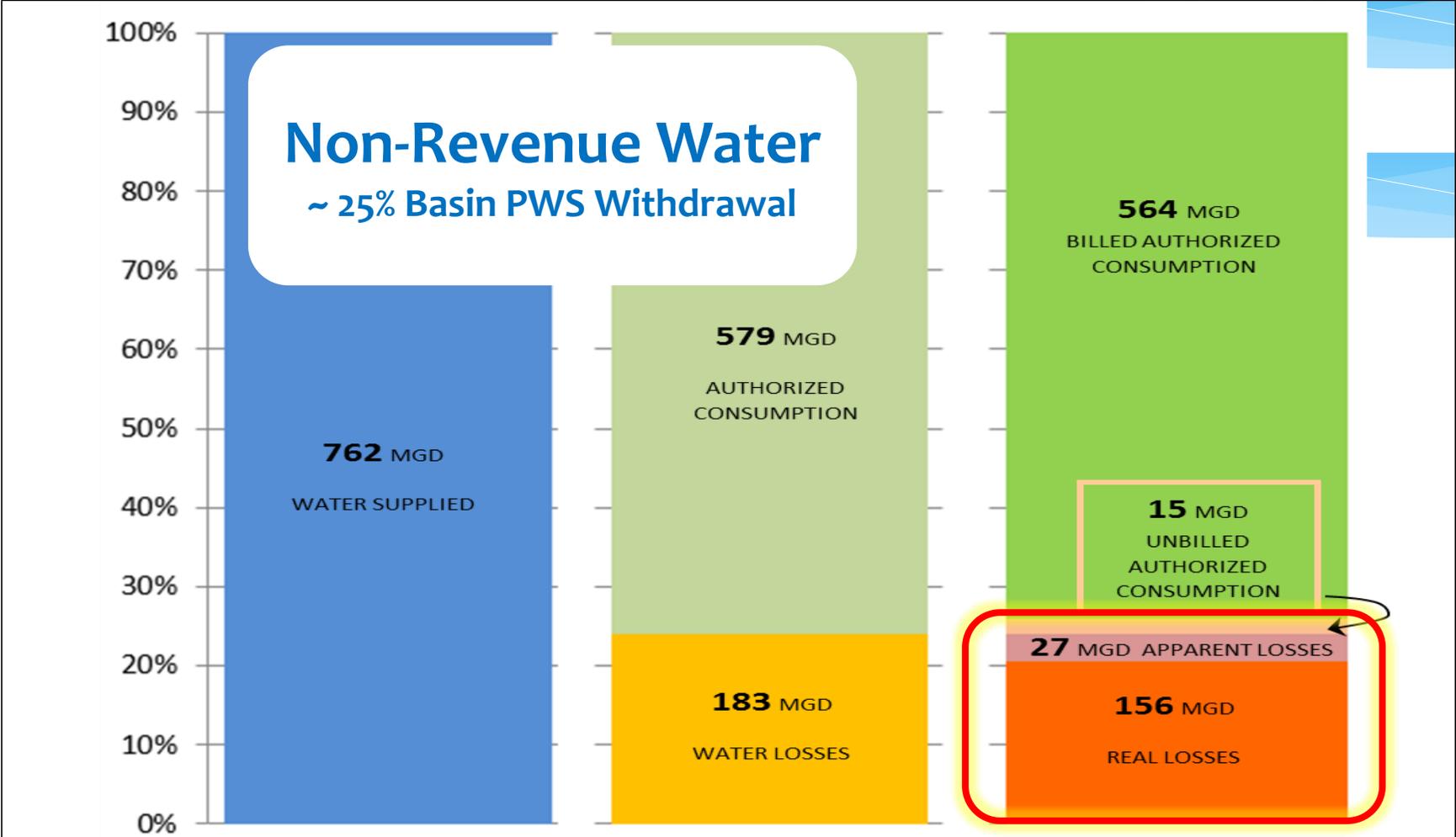
Priority Areas to Improve Grading Score CY2016 - DRB



Non-Revenue Water as % of Water Supplied CY2016 - DRB



DRBC water audit program summary (CY2016)



Billed authorized: All consumption that is billed to customers of the utility; this includes metered and unmetered connections.

Unbilled Authorized: All consumption that is unbilled but is still authorized by the utility. This is likely to include water used in activities such as firefighting, flushing of mains and sewers, street cleaning and fire flow tests. It may also include water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic or institutions free of charge.

Water Demand Management Program Summary

- Raising awareness of best practice & trends in conservation
- DRBC leadership in Water Auditing:
 - One of only a few in the US
 - Training / Support / Validation – Hosting 2018 PA Training
- Future indicators (ILI, gal/conn) for water management
- Asset Management Tool
- Conservation efforts ***are working*** to offset population growth and water auditing could continue this trend

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www.drbc.gov



Managing Our Shared Water Resources since 1961