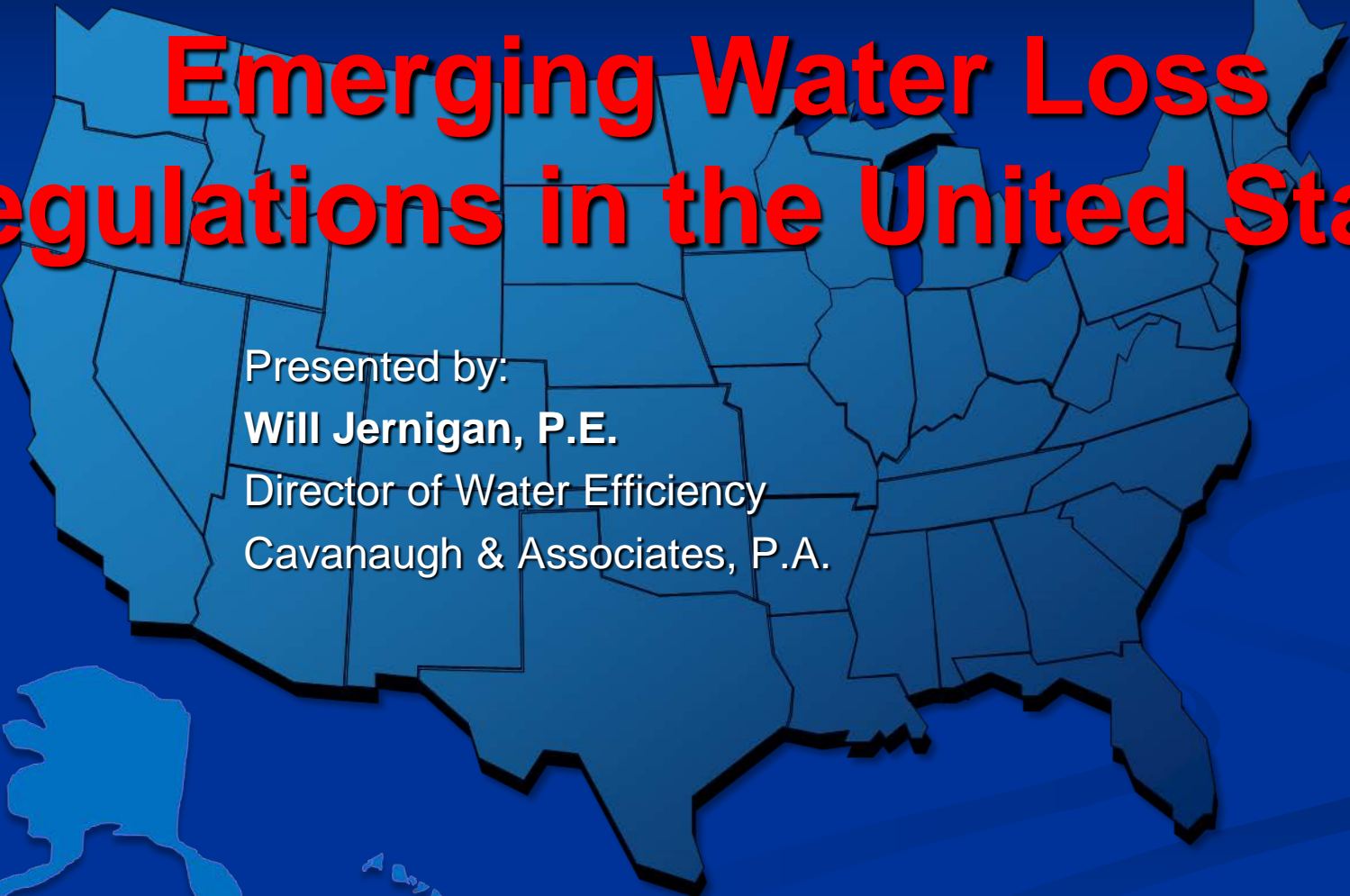


This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



State of the States: Emerging Water Loss Regulations in the United States



Presented by:

Will Jernigan, P.E.

Director of Water Efficiency

Cavanaugh & Associates, P.A.

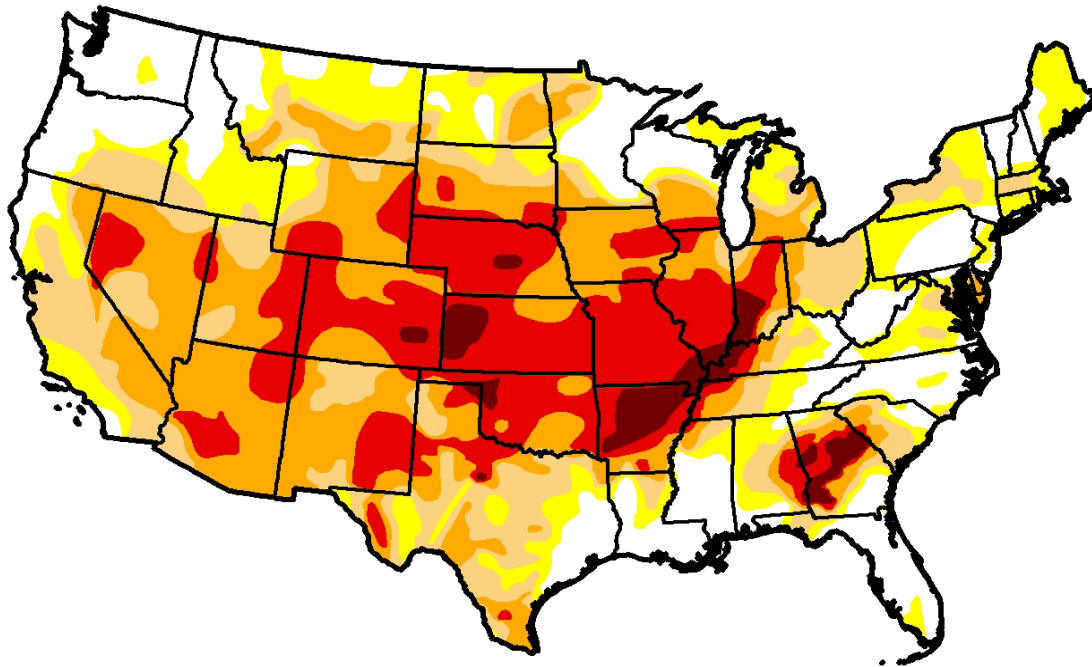
WaterSmart Innovations 2013

Las Vegas, NV

CAVANAUGH

Stewardship Through Innovation

Environmental Pressures



US Drought Monitor: July 2012

USA TODAY
07.10.13
A GANNETT COMPANY

USA TODAY
Dwight Howard
USA TODAY

SUMMER 2003
JUNE 2013

Years ago, Carlos n' Charlie's restaurant along Lake Travis would float when water levels were high. Now it's not even lakeside.

High and dry in Texas

Wendy Koch
@wendykoch
USA TODAY

WEATHERING THE CHANGE

SPICEWOOD, TEXAS In this browning patch of land in central Texas, C.J. Teare could be fined for using fresh water to keep her decades-old oak trees alive, so she relies on soapy water left over from washing clothes.

Water fights (and not the fun kind) are plaguing the Lone Star State as climate change raises the heat — and the stakes.

Political Drivers

SPORTS SCORES INSIDE

THE NATION'S

CROWNE PLAZA
HOTELS & RESORTS

THE PLACE TO MEET.
crowneplaza.com | 1-800-2-CROWNE

\$1.00



Curtis Granderson. Photo by Jim McIsaac, Getty Images

2009 trade pays off

Yankees, Tigers and Diamondbacks are reaping benefits of 3-way deal, 1C

USA TODAY



FALL TV ratings

Pan Am, Unforgettable among those showing promise, but comedy proves to be king, 1, 3D

Newsline

WEDNESDAY, SEPTEMBER 28, 2011



By Matt Hamilton, AP

Insurance cost to cover families up 9%

Depending on Congress' plan to cut debt, premiums could rise more, 1B

When showing affection on a plane, how much is too much?

Actress Leisha Hailey was escorted from a plane after she kissed another woman. The incident raises the question of what's acceptable when surrounded by strangers in close quarters. 3A.

Obama ramps up fundraising for re-election campaign

This week, president held seven West Coast fundraisers: Biden held three in the East. 4A

Can this government be fixed?

Here are three strategies that could help end the paralyzing stalemate in Washington

Hackers shake Web to the core

Security at top levels questioned

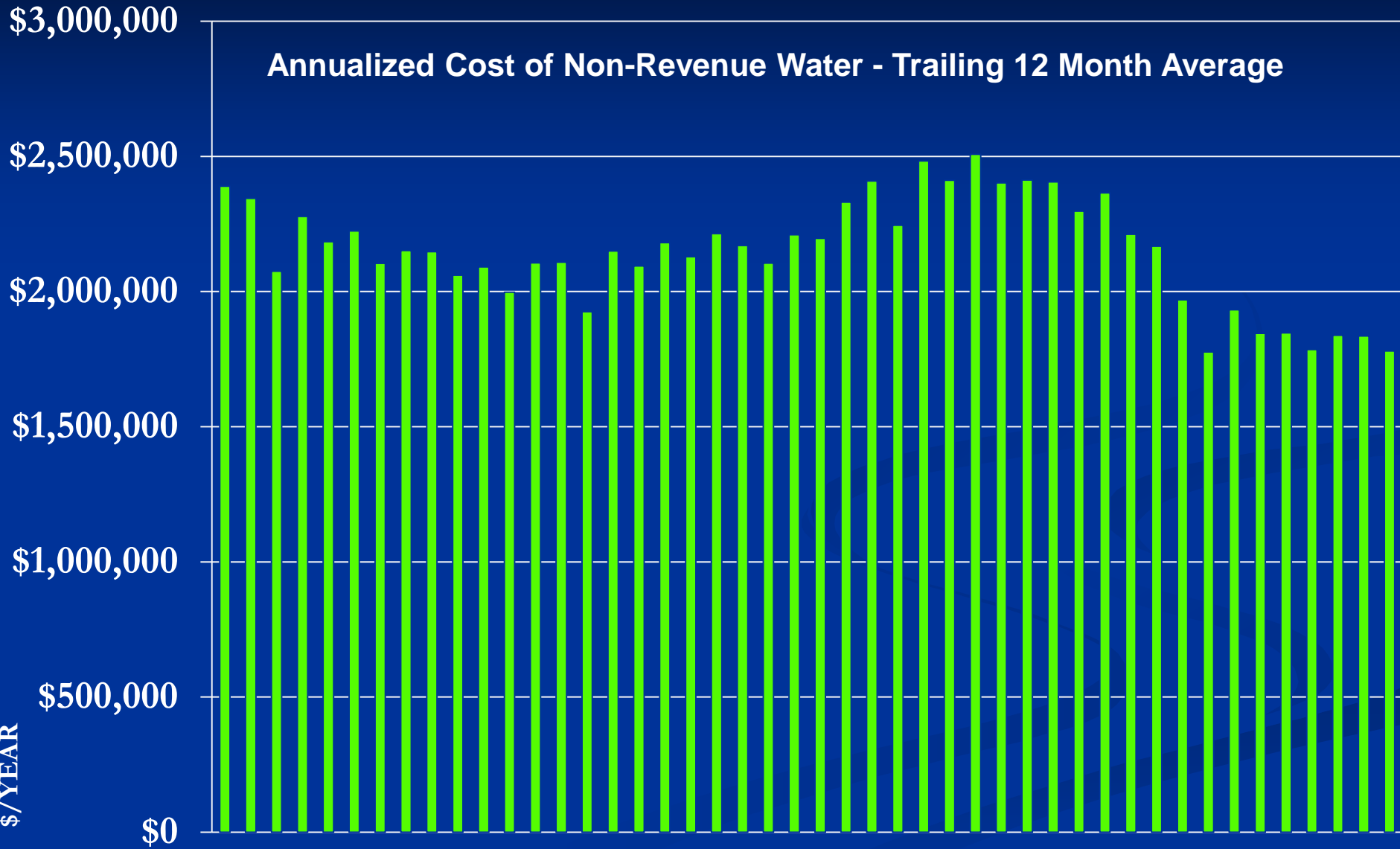
By Byron Acohido
USA TODAY

The keepers of the Internet have become acutely concerned about their ability to protect the most sensitive personal information such as account logons and credit card numbers.

Hackers cracked three companies that work with the most popular Web browsers to ensure the authenticity of Web pages where consumers type in sensitive information.

The hacked firms are among more than 650 digital certificate authorities, or CAs, worldwide that ensure that Web pages are the real deal when displayed by Microsoft's Internet Explorer.

Financial Drivers (Case Study in GA)

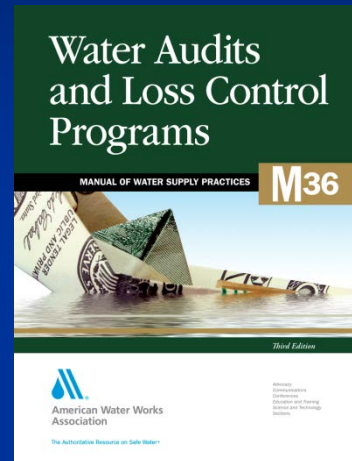


Regulatory Drivers



AWWA Tools for Water Loss Control

- The “M” Series: Manuals of Practice
 - Guidance Manuals: widely recognized around the world as source of best practices in water utility operations and management
- AWWA Water Loss Control Committee’s Free Water Audit Software©
 - Originally released 2006; current Version 4.2 software (2010)
- Water Research Foundation Research Reports
- Textbooks
- www.awwa.org - type “water loss control” in search box; select first item in list



AWWA Water Audit Software Reporting Worksheet

Water Audit Report for [City/State Water Department]

Reporting Year: [2010]

Please enter data in the white cells below. Where possible, entered values should be used. If entered values are available please enter a value. Reference Report Worksheet instructions for data from the field where appropriate. Some values may be calculated.

ALL VOLUMES TO BE ENTERED AS ANNUAL QUANTITIES

WATER SUPPLIED	Volume from own sources	Volume from other sources	Volume from other sources
	91,128	1,128	92,256
	1,128	1,128	2,256
	92,256	2,256	94,512

AUTHORIZED CONSUMPTION

Authorized Consumption	Billied metered	Unbillied metered	Unbillied unmetered
	57,120	1,128	58,248
	1,128	1,128	2,256
	58,248	2,256	60,504

WATER LOSSES (Water Supplied - Authorized Consumption)

Water Losses	Unauthorized consumption	Customer metering inaccuracies	Data handling errors	Approved losses
	34,128	1,128	1,128	36,384
	1,128	1,128	1,128	3,384
	36,384	2,256	2,256	40,896

SYSTEM DATA

System Data	Length of main	Number of valves and tapping service connections	Customer metering inaccuracies	Average length of private pipe	Average operating pressure
	3,000	540,000	1,128	10.0	60.0

COST DATA

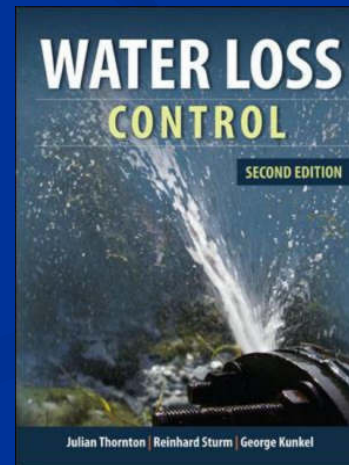
Cost Data	Total annual cost of operating water system	Customer retail unit cost required to recover losses	Variable production cost required to recover losses
	\$12,000,000	\$1.00	\$1.00

DATA REVIEW - Please review the following information and make changes above if necessary:

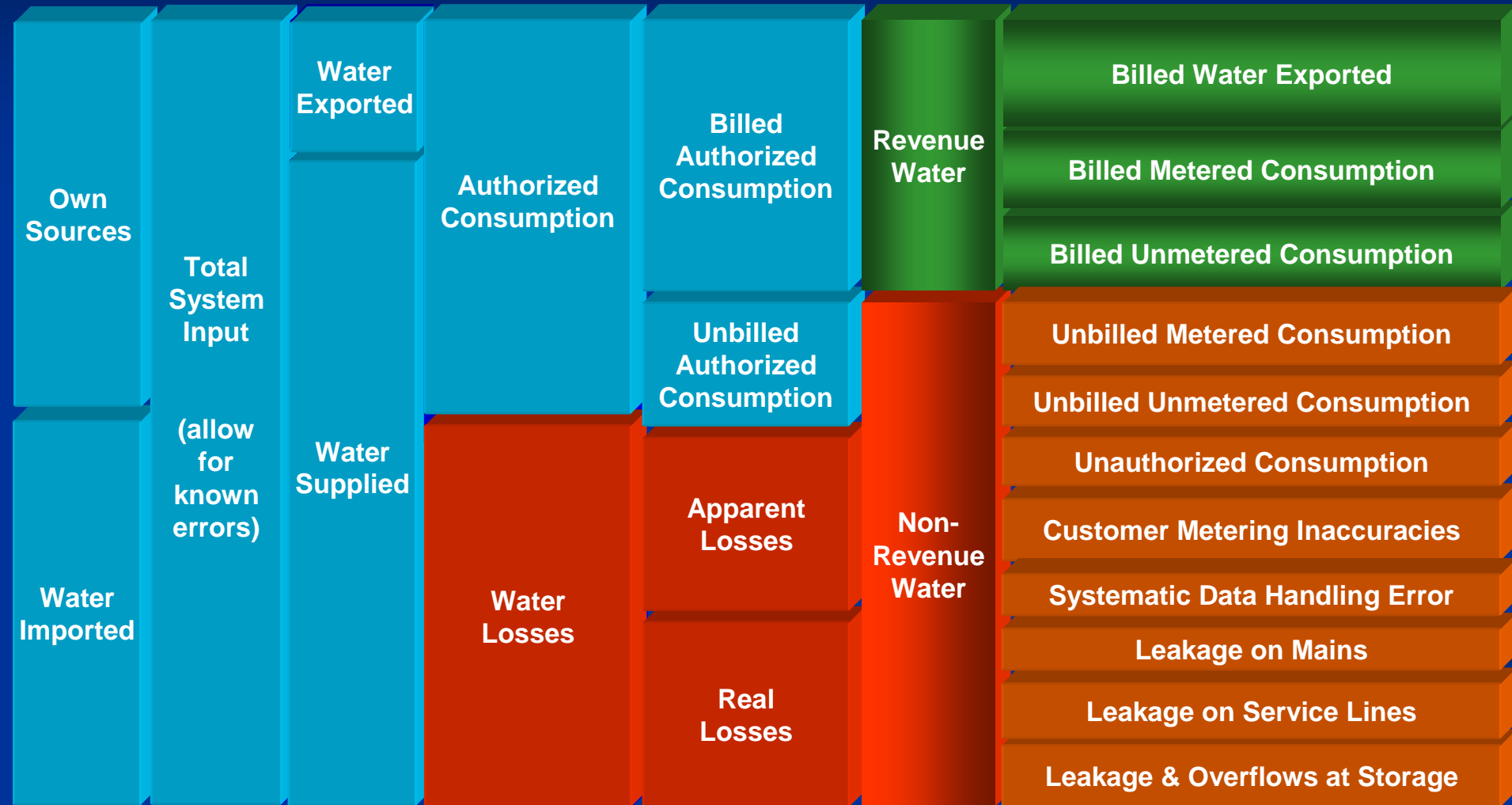
- Input values should be indicated as either measured or estimated. You have entered:
- 1 as measured values
- 1 without specifying measured or estimated
- 11 as measured or estimated. Please specify the meter type - you have entered the measurement type as measured. Unit loss: No problem identified.

PERFORMANCE INDICATORS

Performance Indicators	Non-revenue water as percent of volume	Non-revenue water as percent of cost
	36.4%	17.7%



AWWA-Water Auditing & Loss Control Methodology



Audience Poll

According to the AWWA Water Audit Method, an acceptable level of Unaccounted For Water is:

A. 15%

B. 5%

C. 0%

D. 10%

Audience Poll

According to the AWWA Water Audit Method, an acceptable level of Unaccounted For Water is:

A. 15%

B. 5%

C. 0%

D. 10%



Unaccounted-For No More



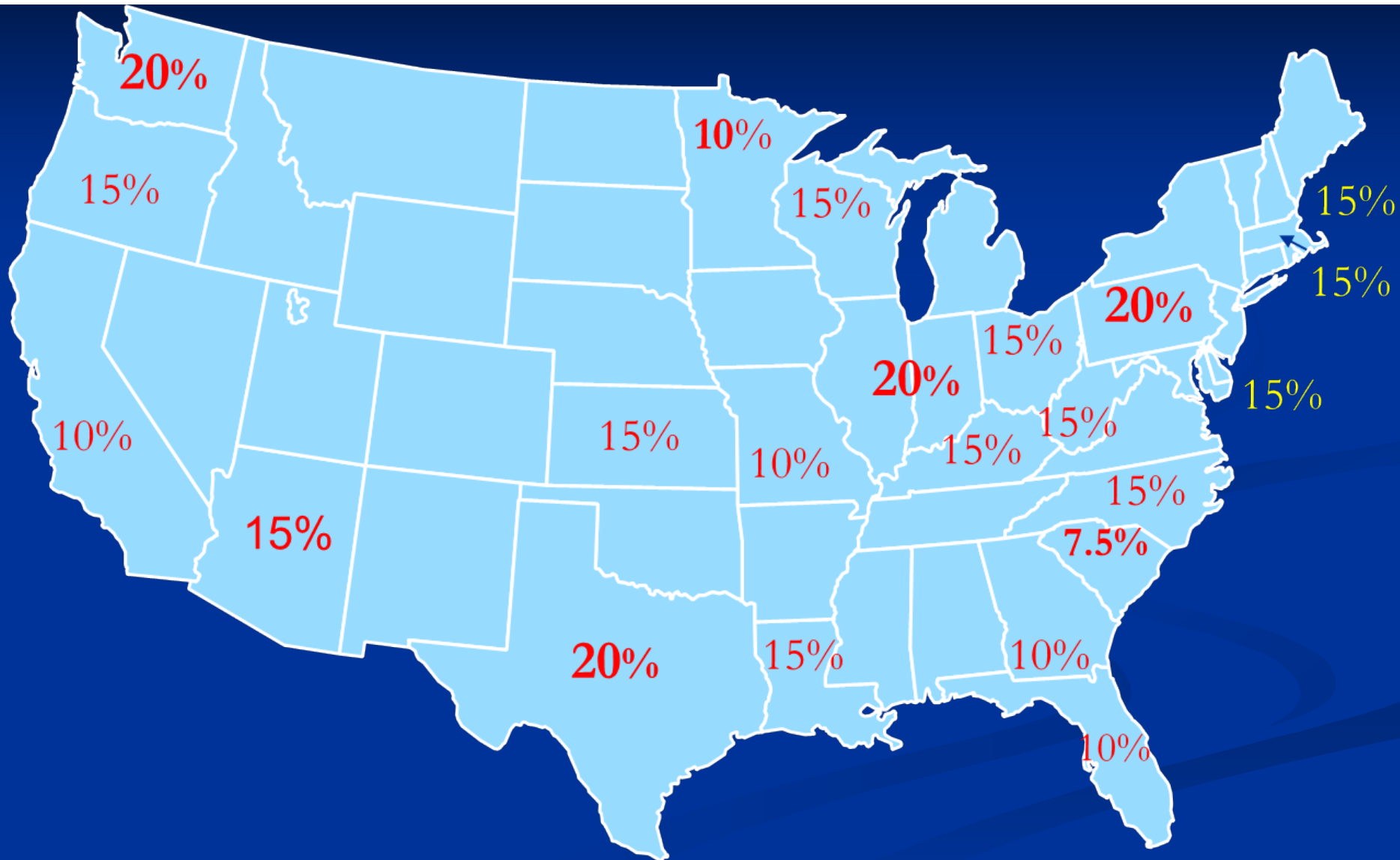
A Look Back...

Table A-1 Summary Policy Findings

Issue	Jurisdictions	States (n = 43)	Other (n=3)	Total (n = 46)
Has some sort of Water-loss Policy Statement	AZ, CA, CT, FL, GA, HI, IN, IA, KS, KY, LA, MD, MA, MN, MD, NV, NH, NY, NC, OH, OR, PA, RI, SC, TN, TX, UT, VT, VA, WA, WV, WI, WY, DRBC, SWFWMD, SJRWMD	33	3	6
Has Formal Definition of Water Loss	AZ, CA, GA, HI, KS, MD, MA, MN, MO, OR, PA, RI, SC, TX, WI, DRBC, JRWMD	15	2	17
Accounting and Reporting	AZ, CA, GA, HI, IA, KS, KY, MD, MA, MN, MO, NY, OH, OR, PA, RI, TX, WV, WI, WY, SWFWMD, SJRWMD	20	2	22
Has Standards and Benchmarks	AZ, CA, GA, HI, IN, KS, KY, LA, MD, MA, MN, MO, NC, OH, OR, PA, RI, SC, TX, UT, WA, WV, WI, DRBC, SWFWMD, SJRWMD	23	3	26
Sets Goals and Targets	AZ, CA, FL, GA, HI, KS, KY, ME, MD, MN, MO, NM, OH, OR, PA, RI, TX, WI, SWFWMD, SJRWMD	18	2	20
Has Planning Requirements	AZ, CA, CT, FL, GA, HI, IA, KS, MD, MA, MN, MO, NV, NH, OR, PA, RI, SC, TX, VT, VA, WA, WV, WI, SWFWMD, SJRWMD, DRBC	24	3	27
Compilation and Publication by Jurisdiction	AZ, CA, HI, KS, KY, MN, PA, RI, WI, SWFWMD	9	1	10
Provides Technical Assistance	AK, CA, FL, GA, HI, KS, KY, ME, NV, ND, OR, PA, RI, SC, TN, TX, VT, WI, SWFWMD	18	1	19
Offers Performance Incentives	CA, GA, HI, IN, IA, LA, MN, NC, RI, TX, VT, SJRWMD	11	1	12
Performs Auditing and Enforcement	AZ, GA, HI, KS, MD, MN, NH, OH, OR, PA, SC, TX, WI, SWFWMD, SJRWMD	13	2	15

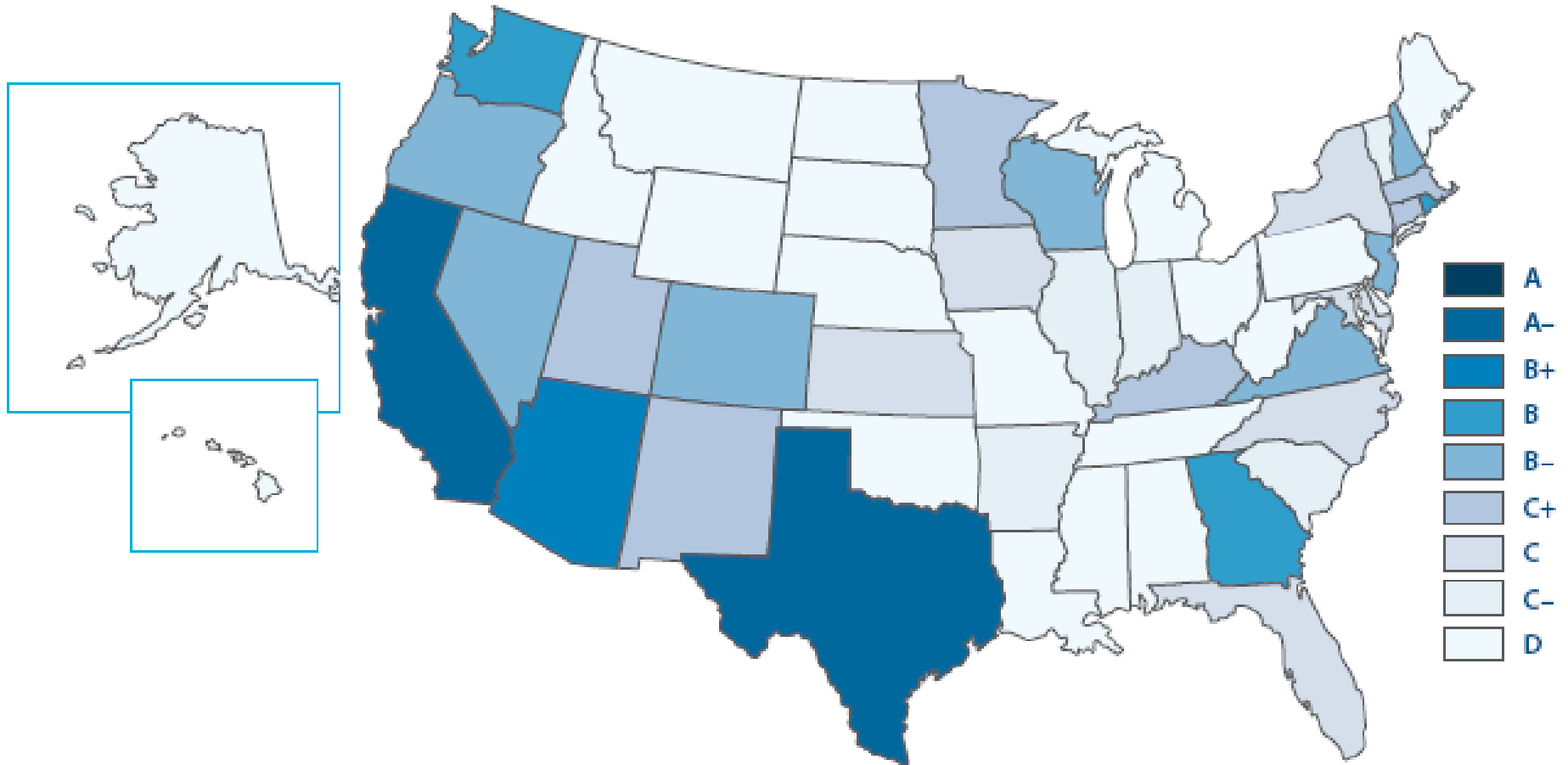
States Survey (Beecher) - 2002

A Look Back...



“Unaccounted For Water” State Standards (2002)

A Look Back...



**Alliance for Water Efficiency
State Scorecard (2012)**

Scope of Research

Audit Required, Incentivized or Neither
 Performance Targets
 AWWA Methodology Conformance
 AWWA Validation
 Indications of Future Rule or Policy Making Regarding AWWA Best Practices

State	Audit is Mandatory	Audit is Incentivized	Performance Target(s)	AWWA Method	AWWA Validation	Compliance Enforcement	Horizon Notes
Tennessee	yes		Graduated DV 65-80, NRW cost% 30-20 now to 2020	yes		Comptroller's Office	
Georgia	yes			yes	yes		Considering performance targets, increased applicability
DRBC	yes			yes			For larger systems, must show a plan to minimize leakage
Wisconsin	yes		WL 25% for small utilities, 15% for large.	close			PSC and DNR did study, seem to have adopted AWWA terms, but UPW still in there.
Texas	yes			yes*			Every 5 years for all, every year for >10000 pop and SRF recipients. As of May 2015 all water suppliers with ow
Oregon	yes		10% Leakage			WL reduction plan	Applicable for permit extension or if condition of an existing permit.
Washington	yes		10% Leakage 3 year avg	close		WLC plan to get <10%	Close to AWWA format.
Massachusetts	yes		10% UPW				Mass Water Resources Commission June 2012 "Standards", Annual Statistical Report submittal req'd for all PW
Minnesota	yes		10% UPW				
Maryland	yes		10% WL			WL reduction plan	Req'd per permit for >10,000 pop systems.
Rhode Island	yes		15% NAW			Leak Detection Survey	"Non-account", or "Non-billed" water.
West Virginia	yes		15% UPW				
West Virginia	yes		15% WL			Response plan	legislation on floor now to comply with AWWA method.
West Virginia	yes		25% WL			Sanitary survey	Enforced through Sanitary Survey
Illinois	yes		8% UPW				Lake Michigan only.
New Jersey	yes		Class Curve				
Florida	yes						SWFWMD requires audits. Others are NW, St Johns, South, Suwanee, don't appear to require audits. EFC small s
Pennsylvania	yes						PUC plans to adopt AWWA method in the next few months
New Mexico	yes			yes			No rule in place, 3 pilots conducted with Office of State Engineer and utilities; water loss considered when new
California	yes		Year 5, improvement or top 20% or below benchmark leakage value	yes, 4.1			CUWCC utilities
Delaware	yes						Req'd for water allocation permits - plan for monitoring, and leakage management
Kentucky	yes		15% UPW				Applies to investor owned-utilities seeking rate cases.
Missouri	yes		10% UPW				Rural Water Grant application asks if project gets UPW below 10%
New York	yes						Permit applicants req's to indicate a WL reduction plan
North Carolina	yes		15% NRW				References AWWA, not required. Part of SRF eligibility. Proposal for inclusion with financial audits.
South Carolina	yes					Sanitary survey	
Virginia	yes		30% Leakage			Sanitary survey	
Alabama							EFC small systems workshop on Water Loss 10/01/13
Alaska							
Arizona							EPA promoting AWWA water auditing with small water systems
Arkansas							Regs reference
Colorado							
Connecticut							Water Supply Plan req'd, including leak management plan
Hawaii							Statewide conservation plan (2013) calls for annual water auditing. The approach to make these audits manda
Idaho							
Iowa							
Kansas							
Kentucky							
Louisiana							
Maine							
Michigan							CNT survey reference
Mississippi							
Montana							
Nebraska							
Nevada							5 year cycle conservation plans require loss reduction planning
North Dakota							
Ohio							
South Carolina							
Puerto Rico							DWRB Comprehensive Water Conservation Plan (2012) calls for AWWA auditing and loss control
South Dakota							Recent rate increases may be a catalyst for water loss regulations. In order to try to minimize the amount of t
Texas							
Utah							
Vermont							
Washington							
West Virginia							
Wisconsin							

Research Methodology

Building on a body of work

States Survey (Beecher 2002)

State Scorecard (AWE/ELI 2012)

Research compiled through review of

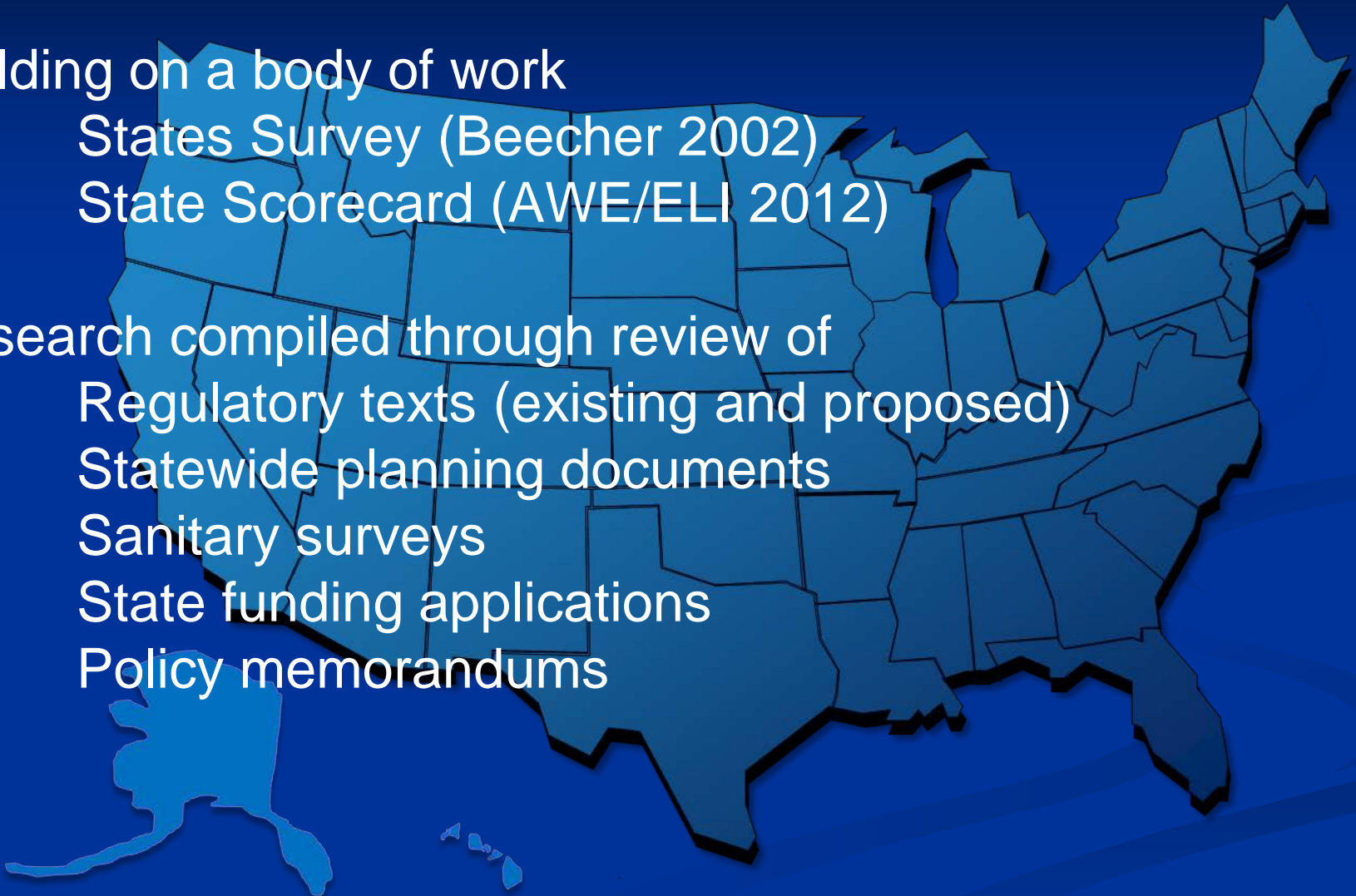
Regulatory texts (existing and proposed)

Statewide planning documents

Sanitary surveys

State funding applications

Policy memorandums



Acknowledgements

Acknowledgements to colleagues providing input and reference information:

Gary Trachtman, Malcom Pirnie/ARCADIS

Andrew Chastain-Howley, Black & Veatch

Simon Wick, Matchpoint Inc.

Isabel Szendry, PRASA

Patti Godwin, American Leak Detection

George Kunkel, Philadelphia Water Department

John Van Arsdel, ME Simpson Company

Robbie Cornett, Washington County Service Authority

Kate Gasner, WSO

Barry Usagawa, Hawaii Board of Water Supply

Bill Christiansen, Alliance for Water Efficiency

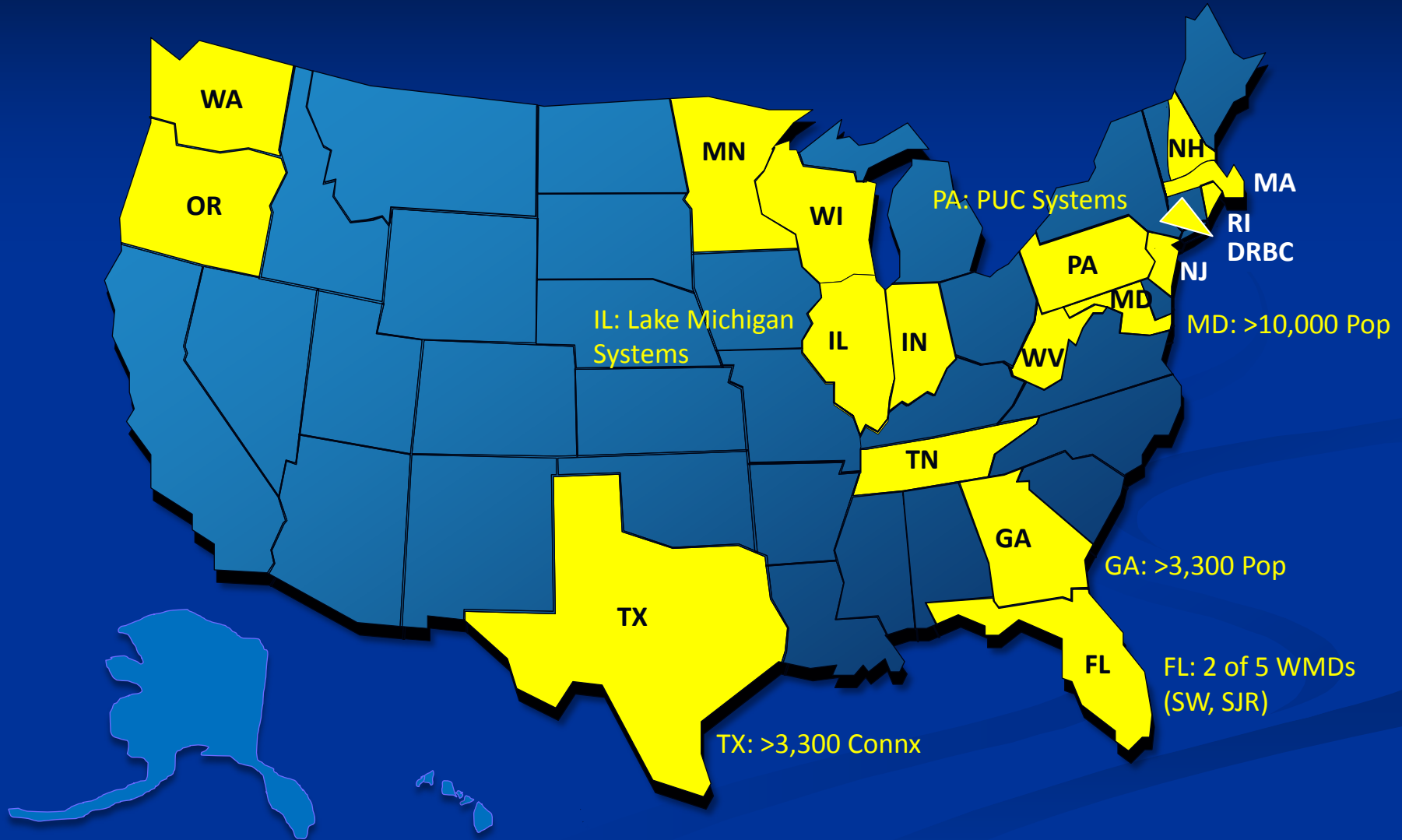
Carl McMorran, Aquarion Water Company of New Hampshire

Jason Bodwell, Georgia Environmental Finance Authority

State of the States - 2013



Water Loss Auditing Required



Water Loss Auditing Required w/ Performance Targets

10% Leakage,
3 year average

10% UFW

25% WL (small)
15% (large)

15% WL

10% UFW

10% Leakage

WA

OR

MN

WI

25% WL

NH

MA

DRBC

RI 15% NAW

PA

MD

NJ Median UFW %
of Class

8% UFW

IL

IN

10% WL

WV

15% UFW

TN

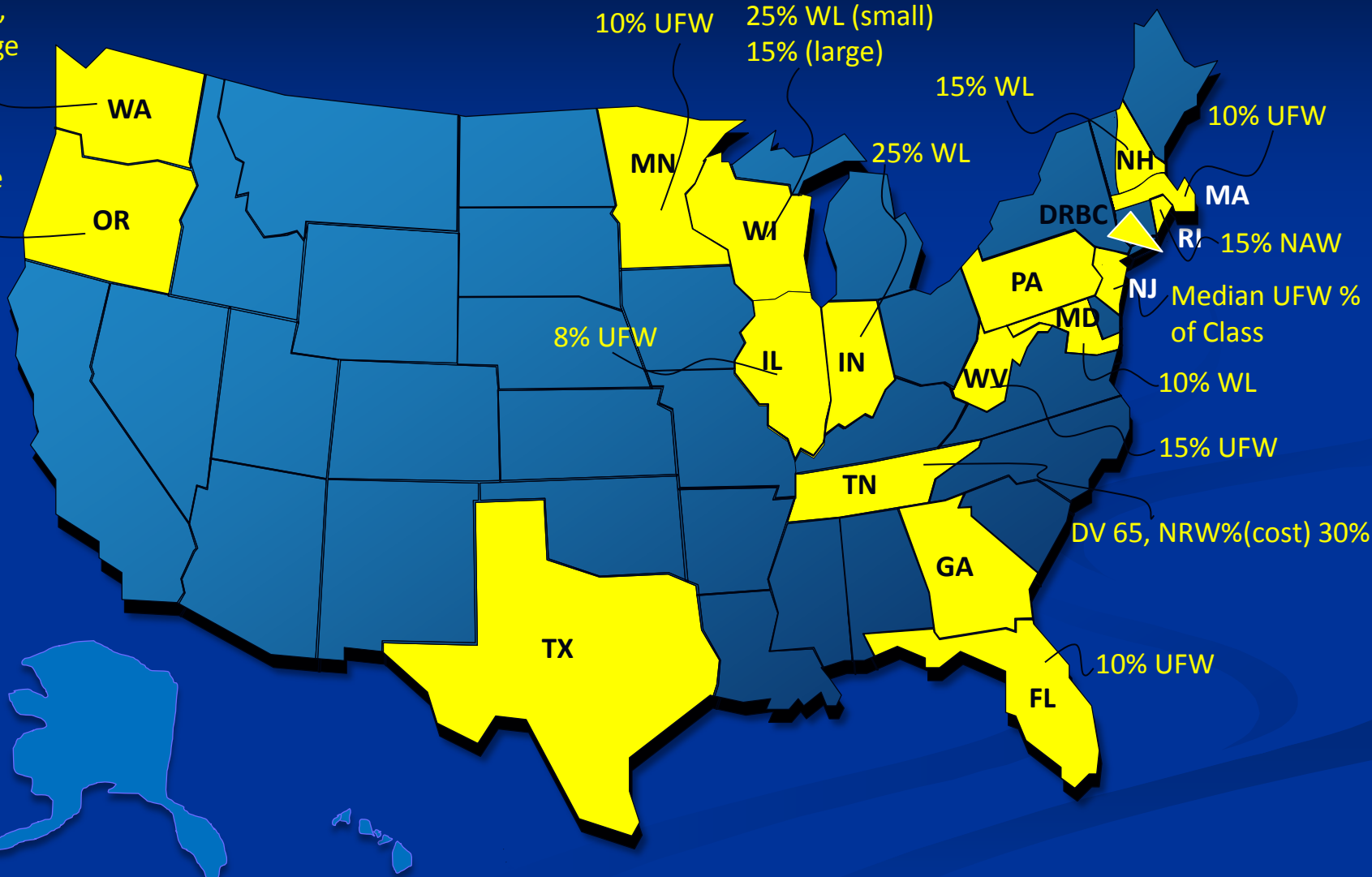
DV 65, NRW%(cost) 30%

GA

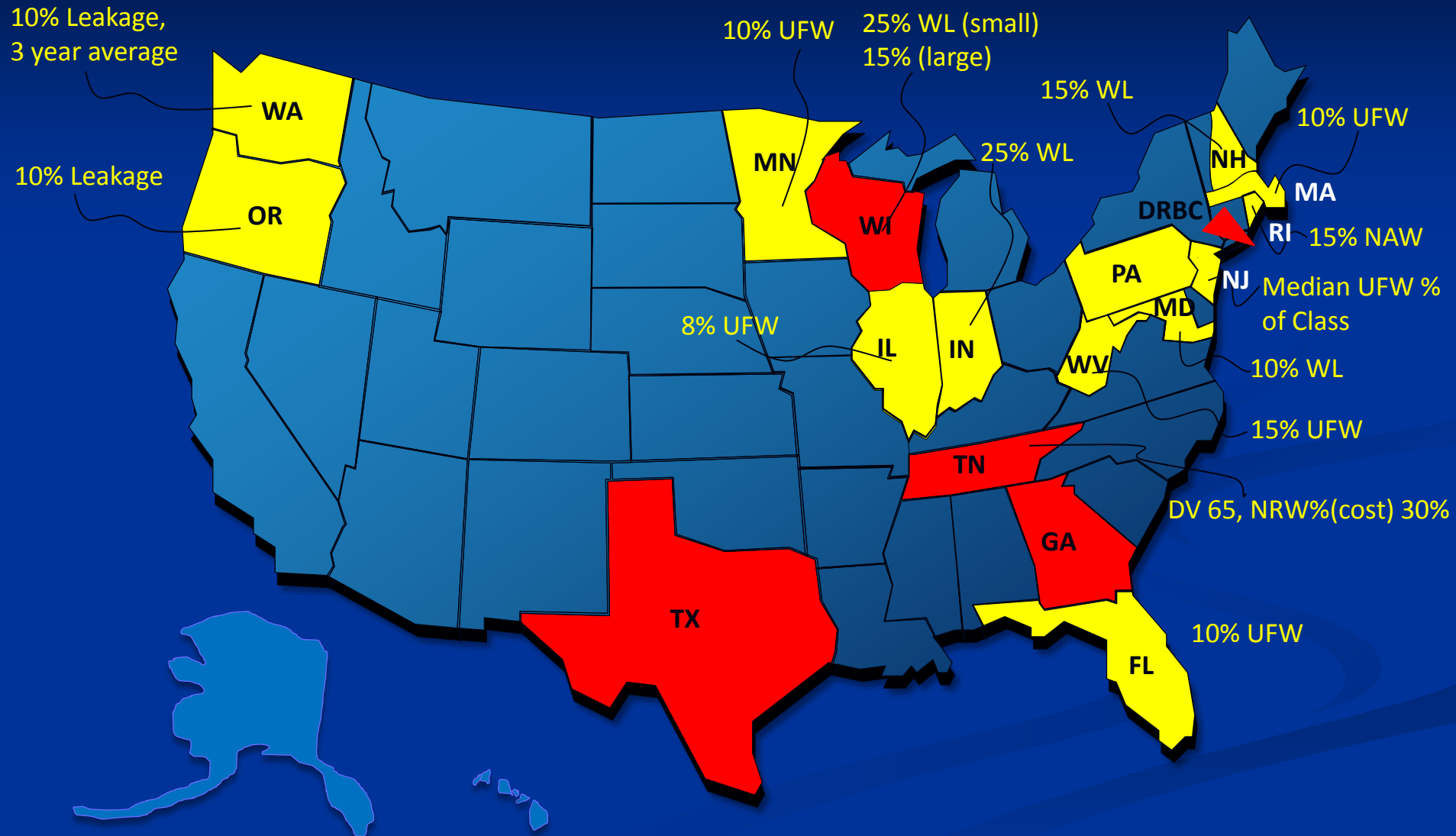
TX

10% UFW

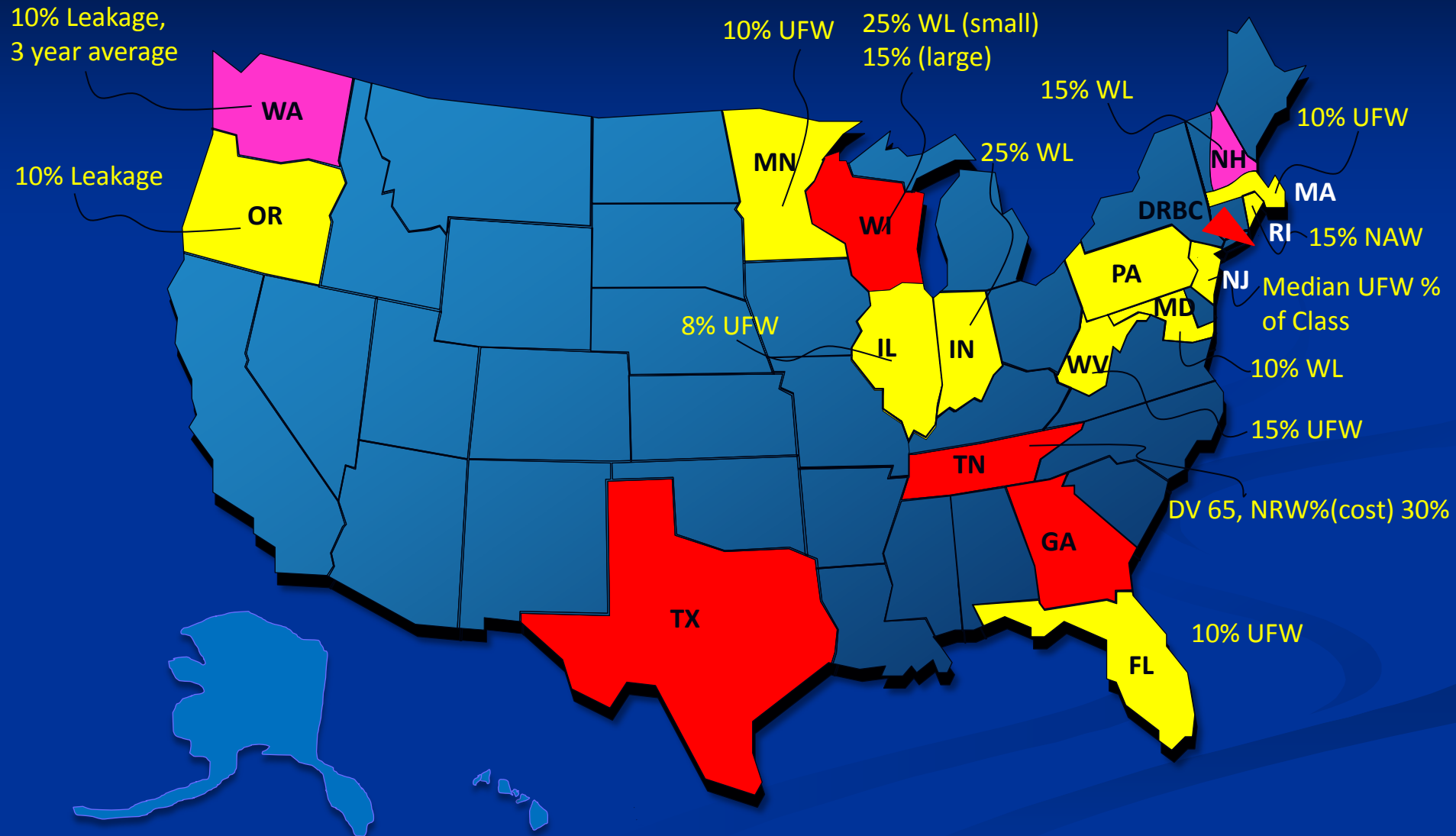
FL



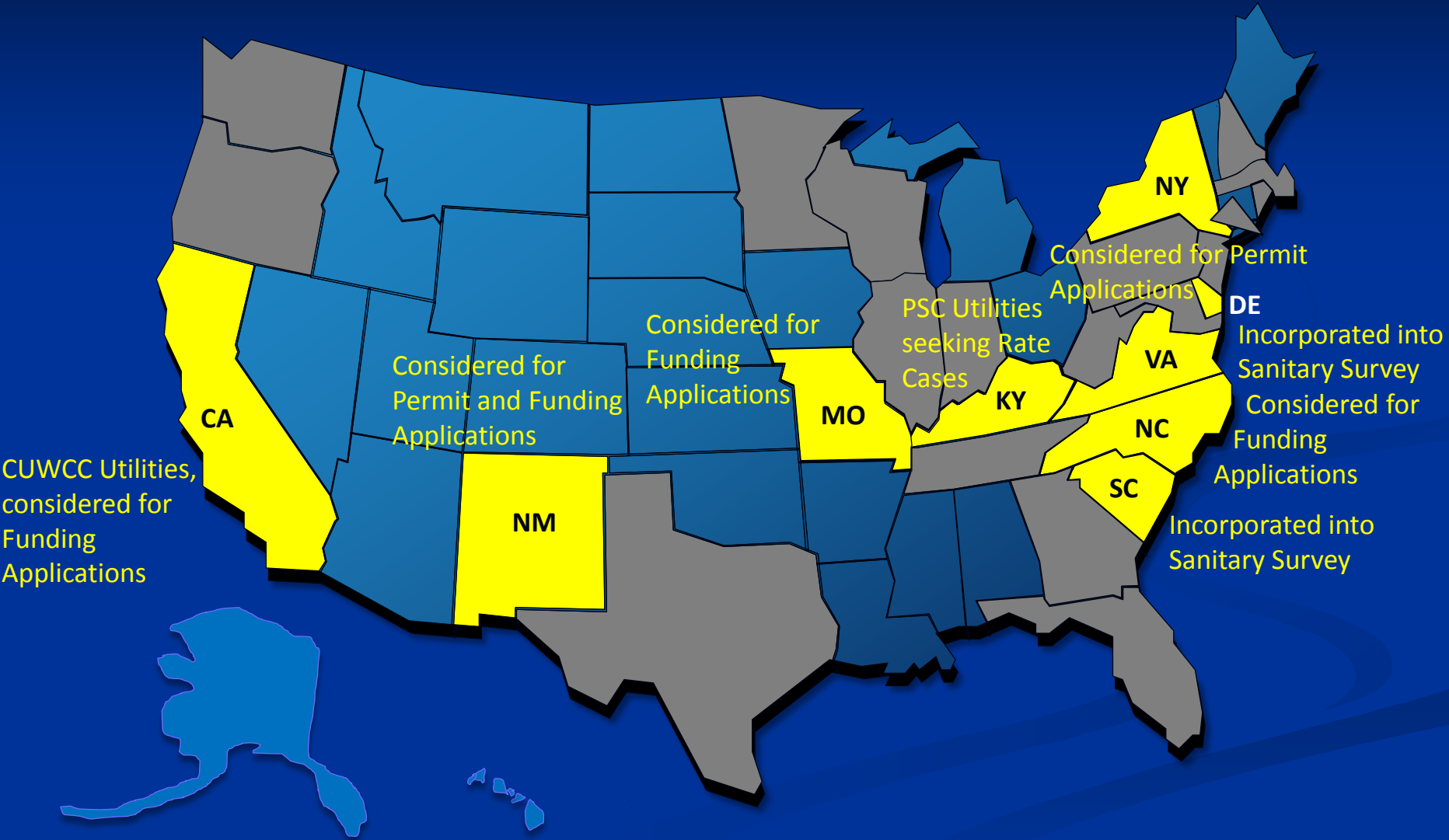
Water Loss Auditing Required w/ Performance Targets Per **AWWA Methodology**



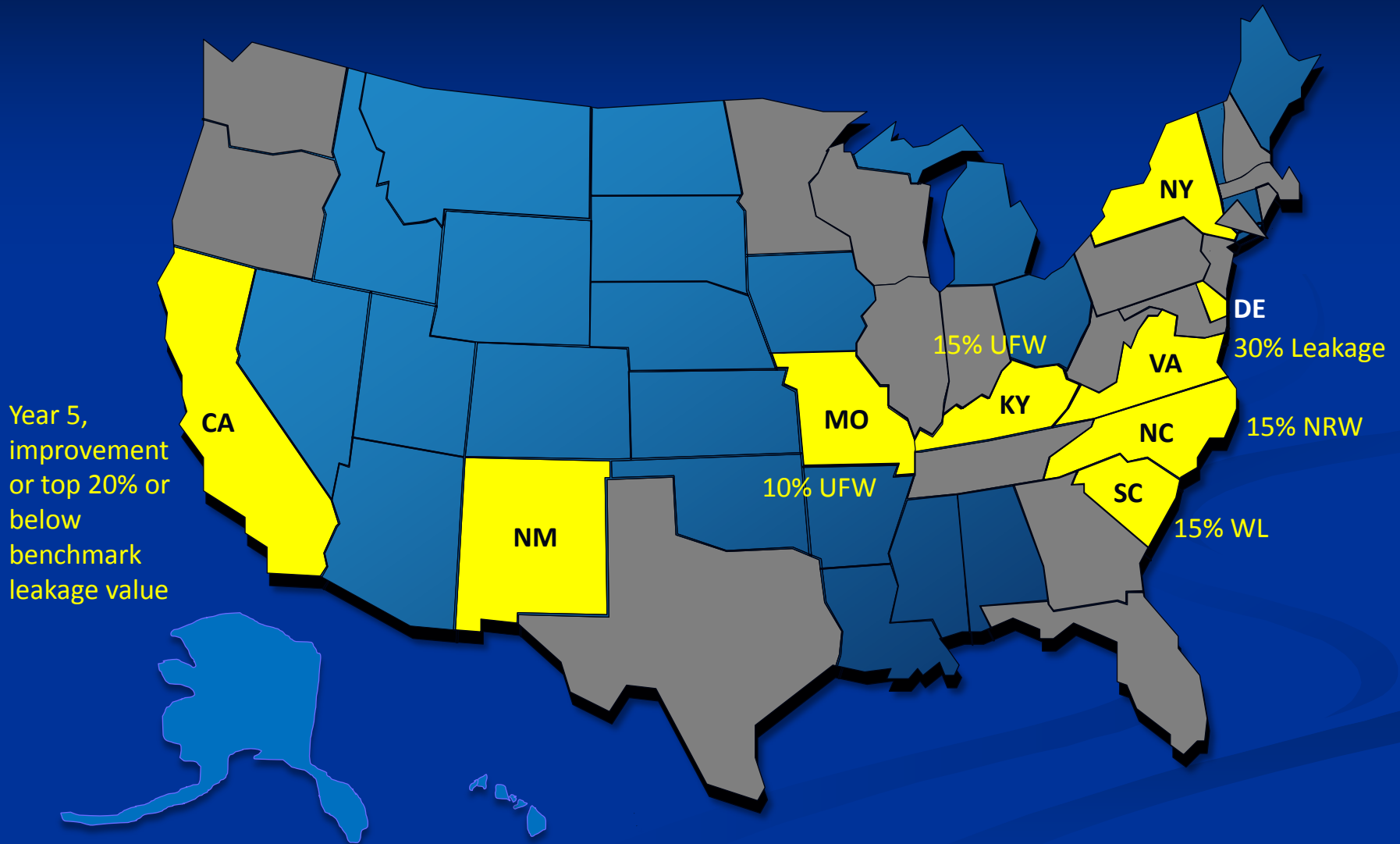
Water Loss Auditing Required w/ Performance Targets Resembling AWWA Methodology



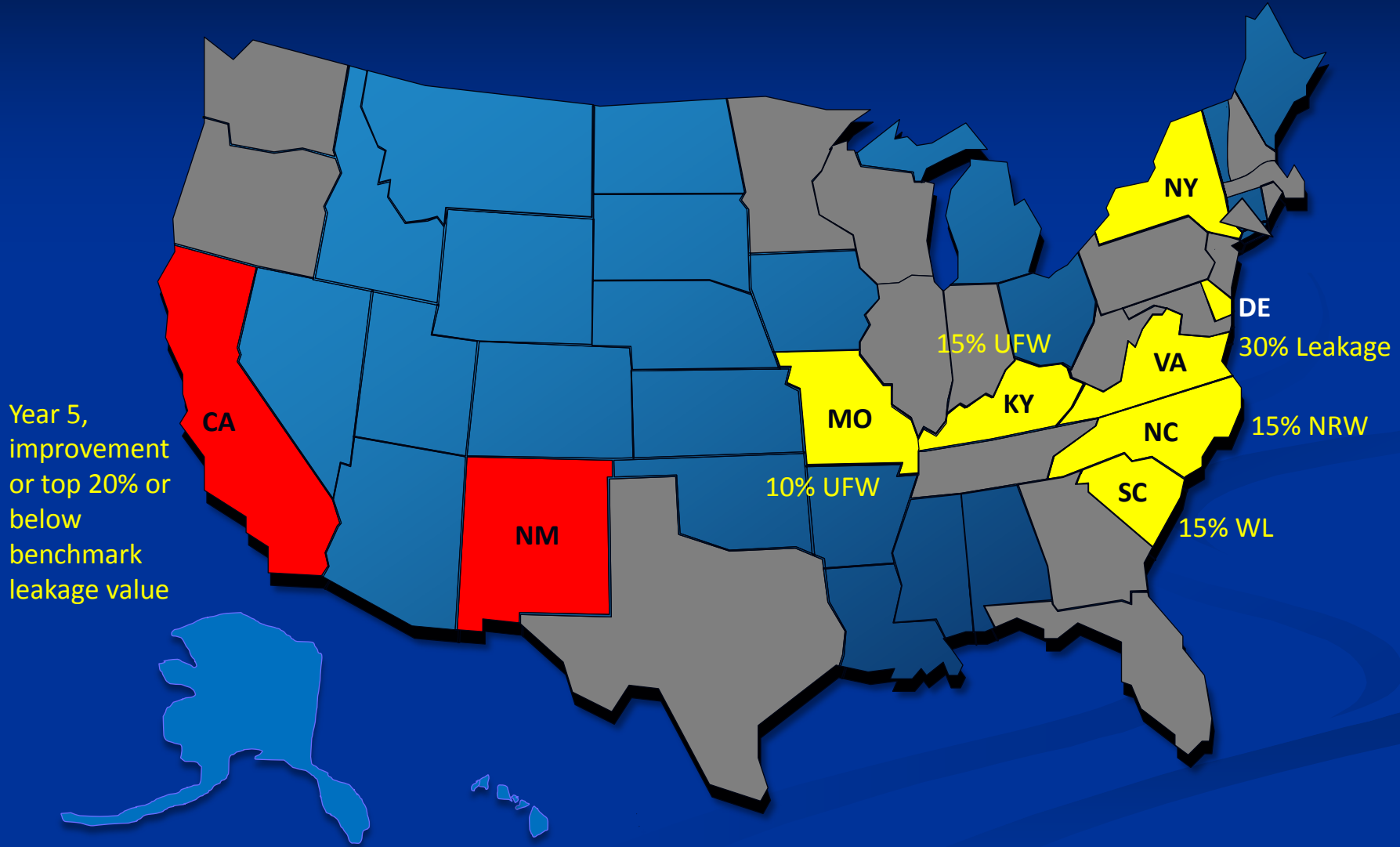
Water Loss Auditing Incentivized



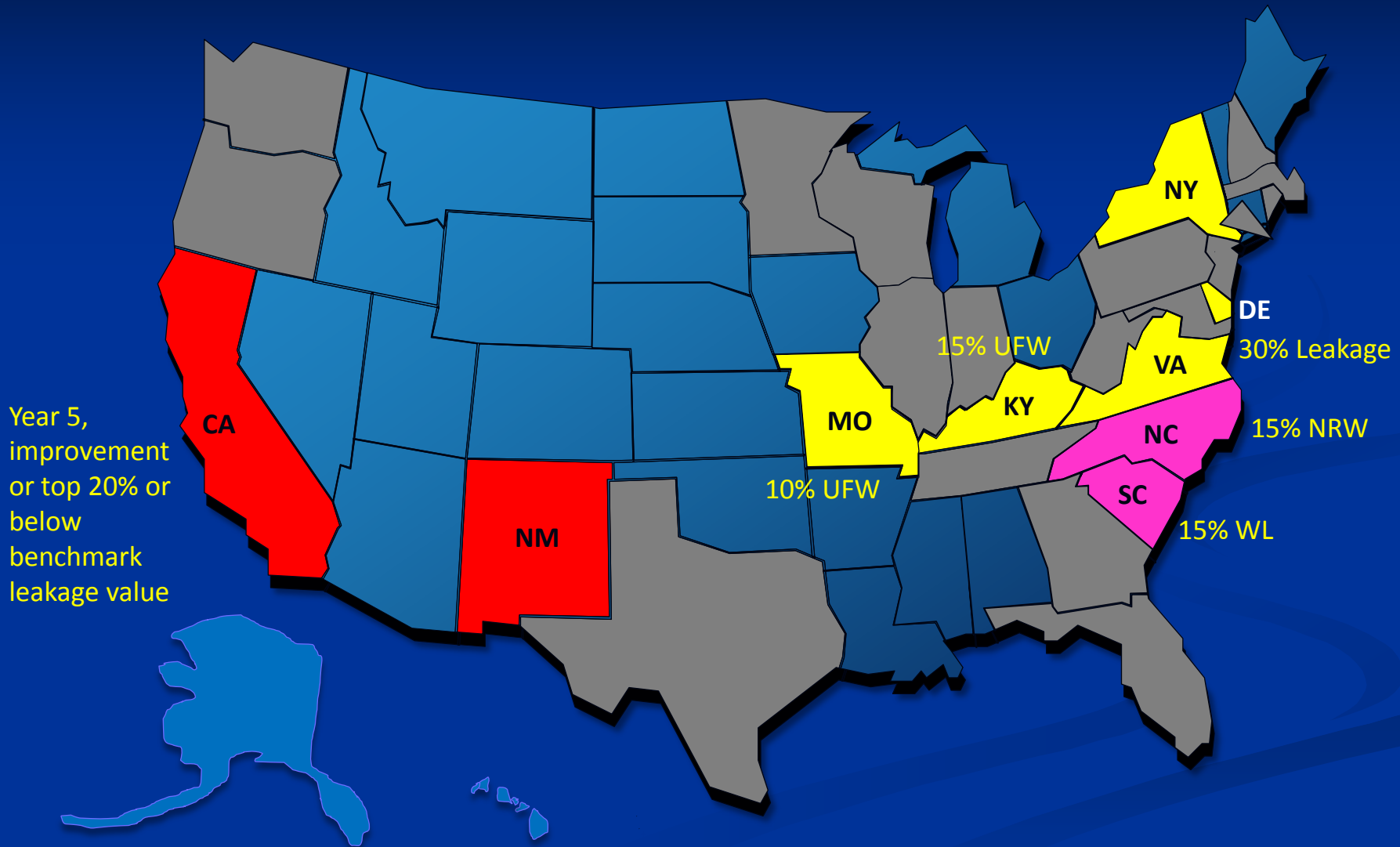
Water Loss Auditing Incentivized w/ Performance Targets



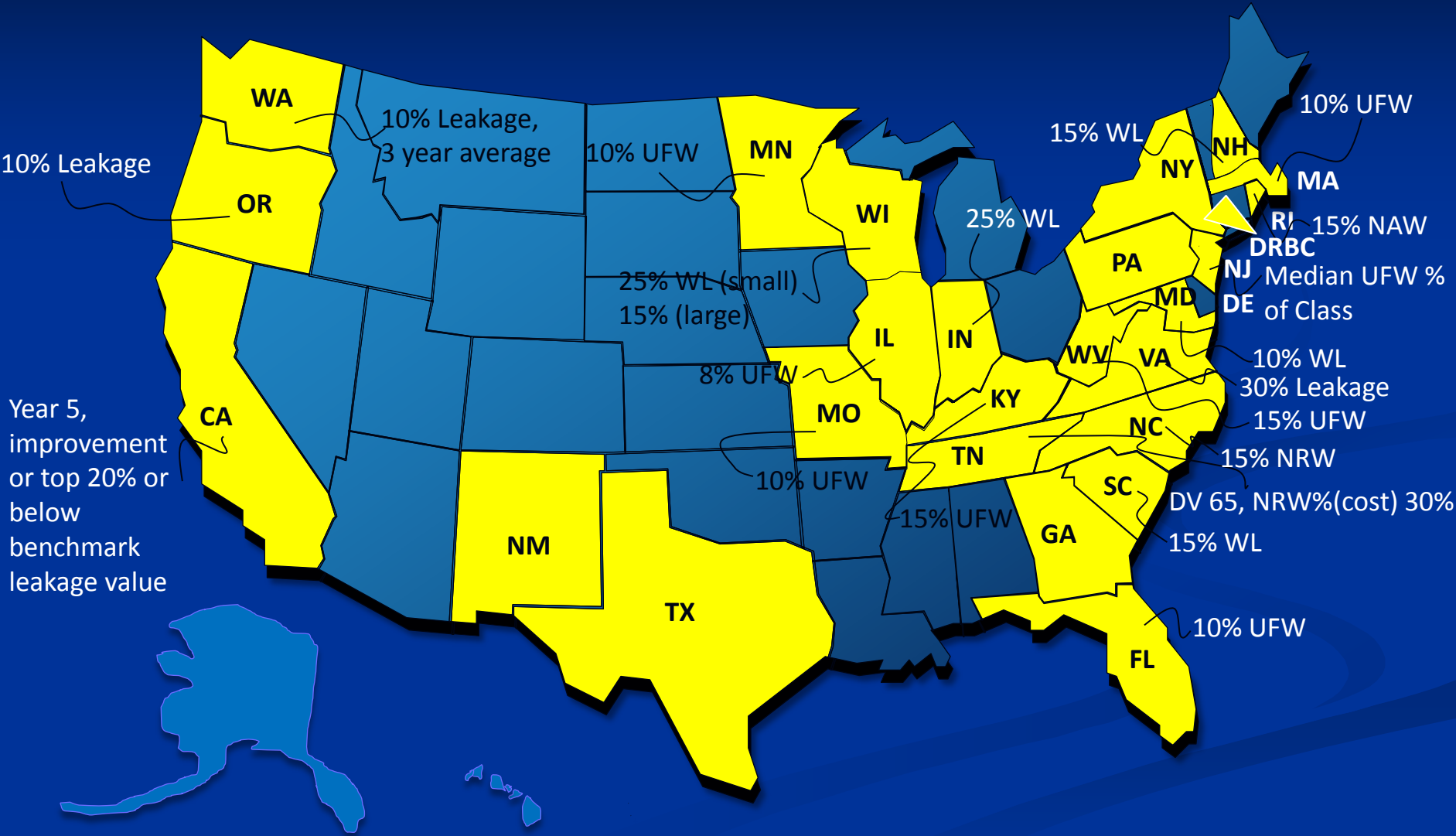
Water Loss Auditing Incentivized w/ Performance Targets Per **AWWA Methodology**



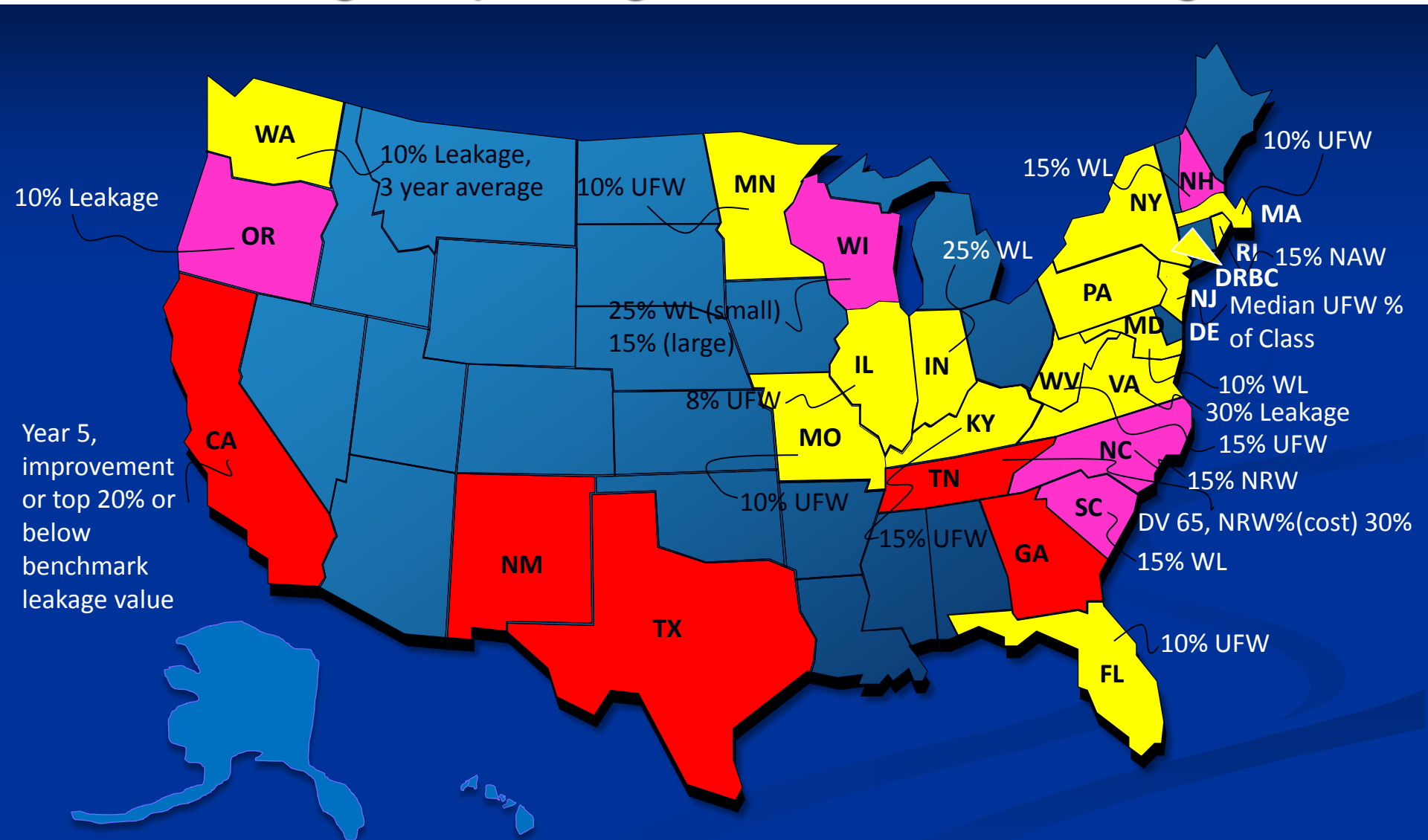
Water Loss Auditing Incentivized w/ Performance Targets Resembling AWWA Methodology



Landscape of Varying Mechanisms for Water Loss Auditing, Reporting & Performance Targets



Landscape of Varying Mechanisms for Water Loss Auditing, Reporting & Performance Targets



A Look Ahead...



State of the States - Future

Maintenance of current database

Audit required

Audit incentivized

Performance targets

AWWA methodology for auditing and loss control

Expansion of database

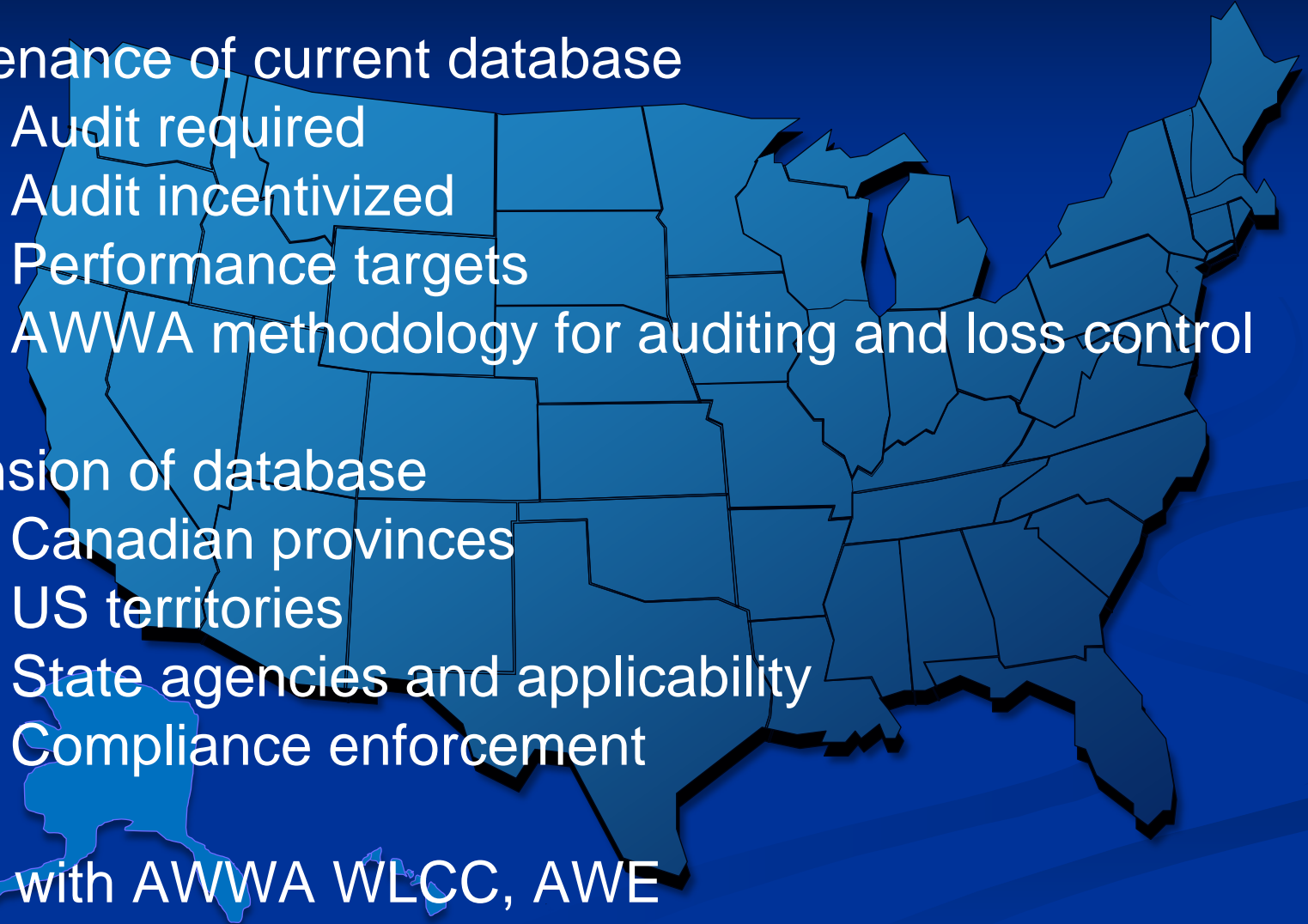
Canadian provinces

US territories

State agencies and applicability

Compliance enforcement

Share with AWWA WLCC, AWE



State of the States:

Emerging Water Loss Regulations in the United States

Presented by:

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