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SWRCB Real Loss Targets

Water Smart Innovations
2021-10-07

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WATER SYSTEMS OPTIMIZATION

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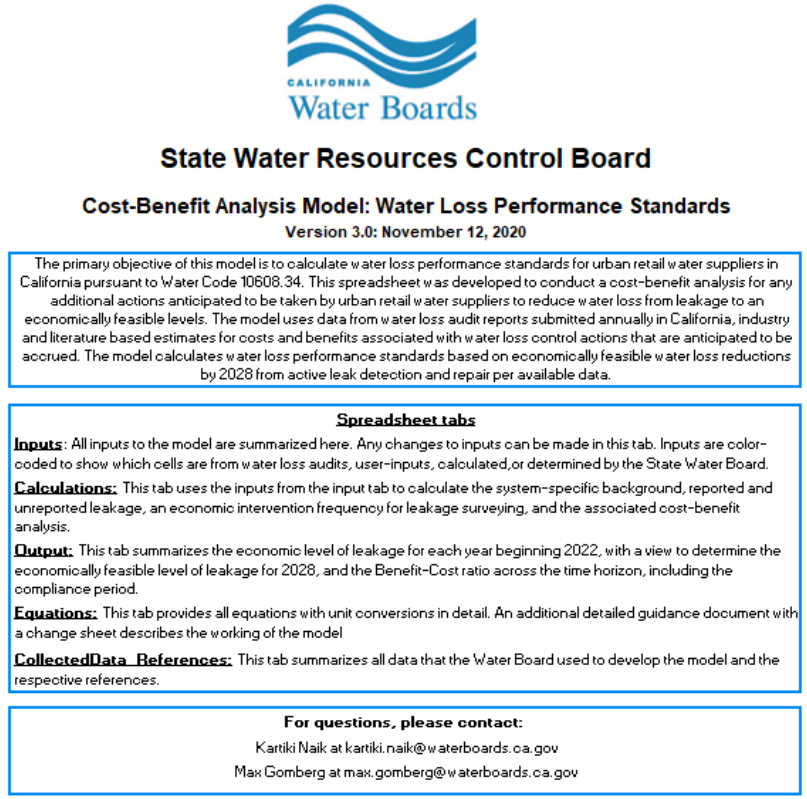
Agenda

- Regulatory Background
- SWRCB Model Framework
- Evaluating Input Impact
- Summary of Selected Inputs
- Adjustment Filing Overview



CALIFORNIA Water Boards

State Water Resources Control Board

Cost-Benefit Analysis Model: Water Loss Performance Standards

Version 3.0: November 12, 2020

The primary objective of this model is to calculate water loss performance standards for urban retail water suppliers in California pursuant to Water Code 10608.34. This spreadsheet was developed to conduct a cost-benefit analysis for any additional actions anticipated to be taken by urban retail water suppliers to reduce water loss from leakage to an economically feasible levels. The model uses data from water loss audit reports submitted annually in California, industry and literature based estimates for costs and benefits associated with water loss control actions that are anticipated to be accrued. The model calculates water loss performance standards based on economically feasible water loss reductions by 2028 from active leak detection and repair per available data.

Spreadsheet tabs

Inputs: All inputs to the model are summarized here. Any changes to inputs can be made in this tab. Inputs are color-coded to show which cells are from water loss audits, user-inputs, calculated,or determined by the State Water Board.

Calculations: This tab uses the inputs from the input tab to calculate the system-specific background, reported and unreported leakage, an economic intervention frequency for leakage surveying, and the associated cost-benefit analysis.

Output: This tab summarizes the economic level of leakage for each year beginning 2022, with a view to determine the economically feasible level of leakage for 2028, and the Benefit-Cost ratio across the time horizon, including the compliance period.

Equations: This tab provides all equations with unit conversions in detail. An additional detailed guidance document with a change sheet describes the working of the model

CollectedData_References: This tab summarizes all data that the Water Board used to develop the model and the respective references.

For questions, please contact:

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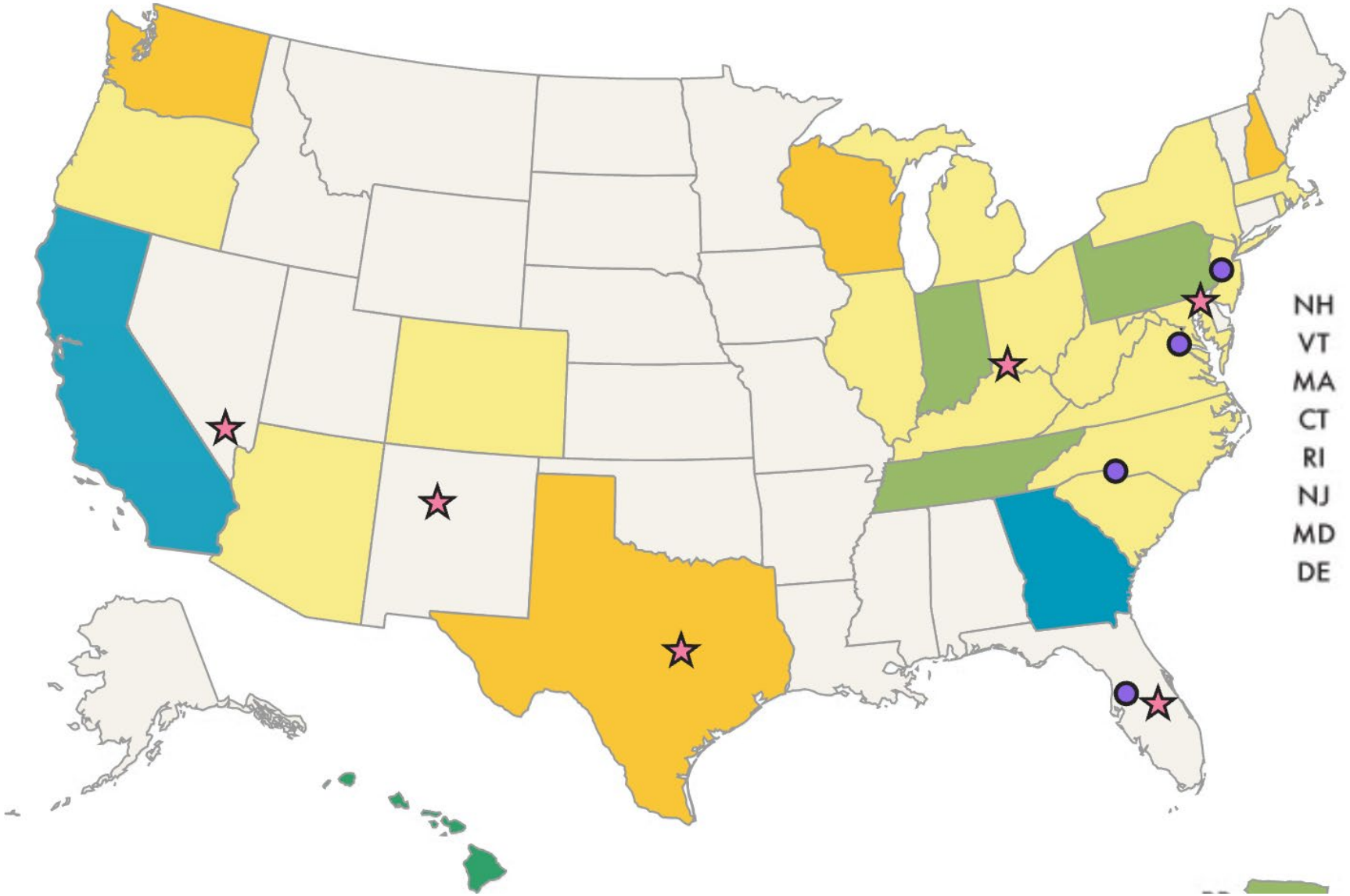
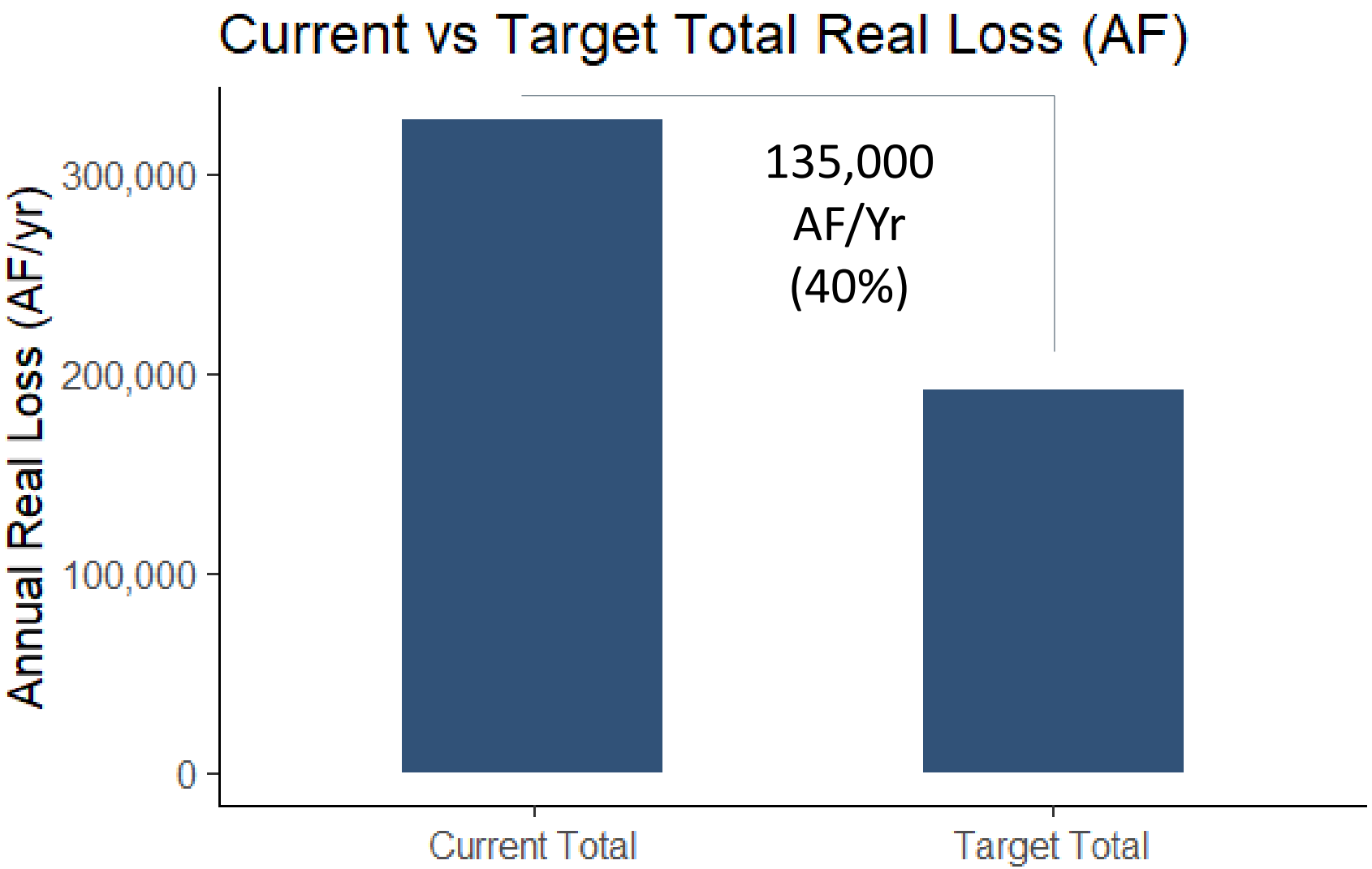
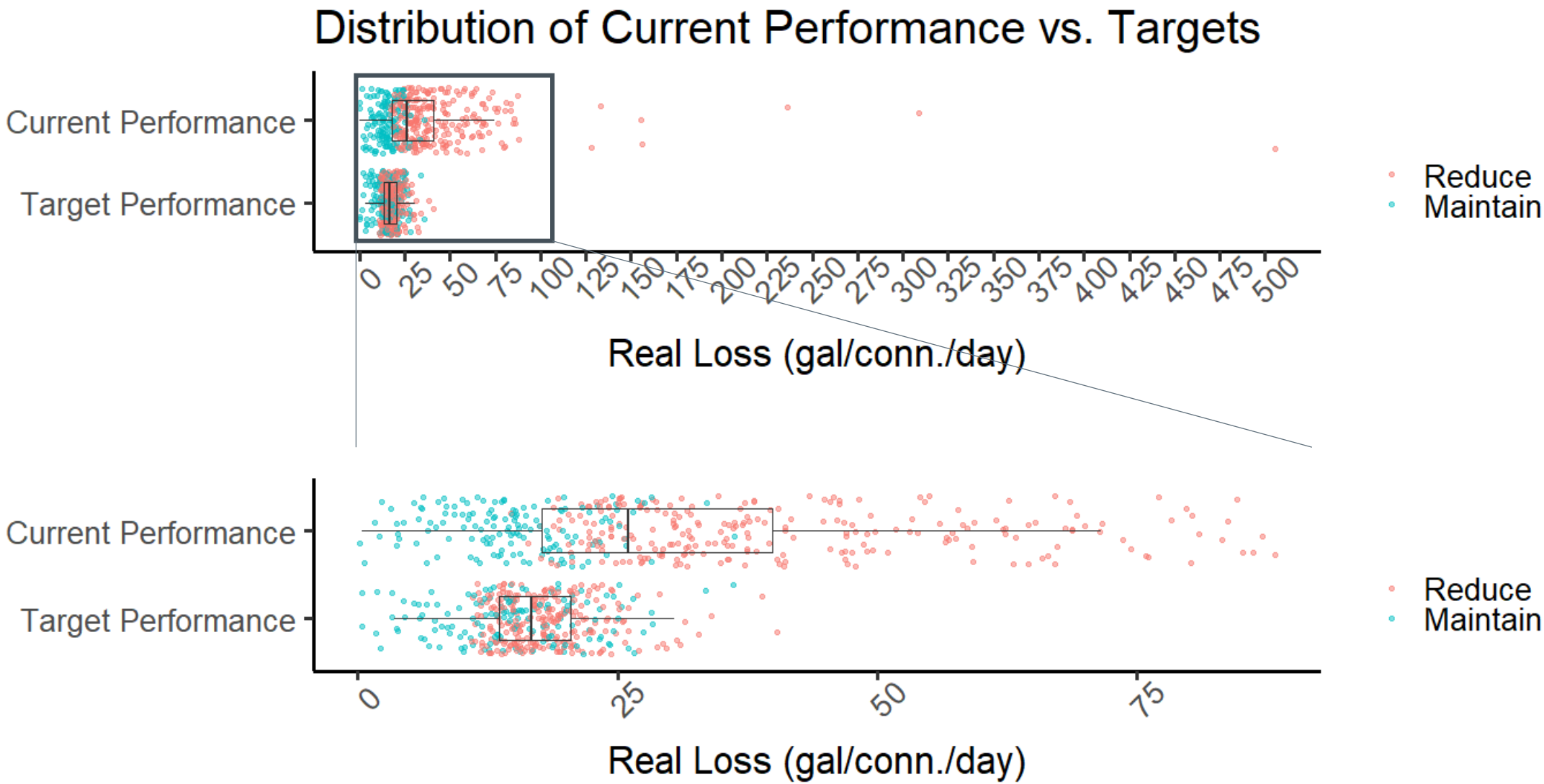
US Regulatory Context – Credit: NRDC



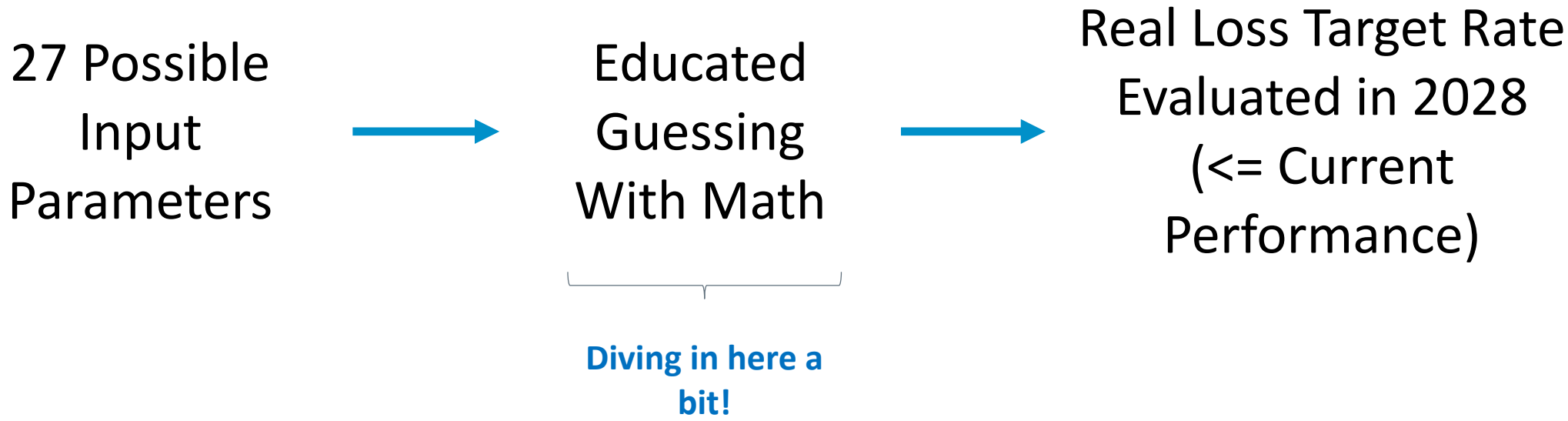
Urban Water Use & Loss Standards

Standards Summary – Default Inputs (N = 409)




Distribution of Current Performance vs. Targets
Current Performance
Target Performance
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
400
425
450
475
500
Real Loss (gal/conn./day)
Reduce
Maintain
Current Performance
Target Performance
0
25
50
75
Real Loss (gal/conn./day)
Reduce
Maintain

SWRCB Model Overview (April 2021 Release)



Two Windows for Adjusting Model Inputs:
(Now through end of formal rulemaking period (spring 2022?) &
July 2023

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Why is it Worth Understanding the Mechanics?

- **CA Water Agencies:** Intuition of the model is useful for input adjustment filings.

- **Other Water Agencies:** Model includes elements of a real loss component analysis, the industry standard modeling approach for real loss planning.

- **Policy Makers:** Understand the target setting landscape to help evaluate opportunities in other regions.

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Types of Real Losses - Definitions

Background Leakage

Undetectable using traditional acoustic equipment

Unreported Leakage

Detectable using traditional acoustic equipment.

Reported Leakage

Surfaced and is reported by public or utility staff.

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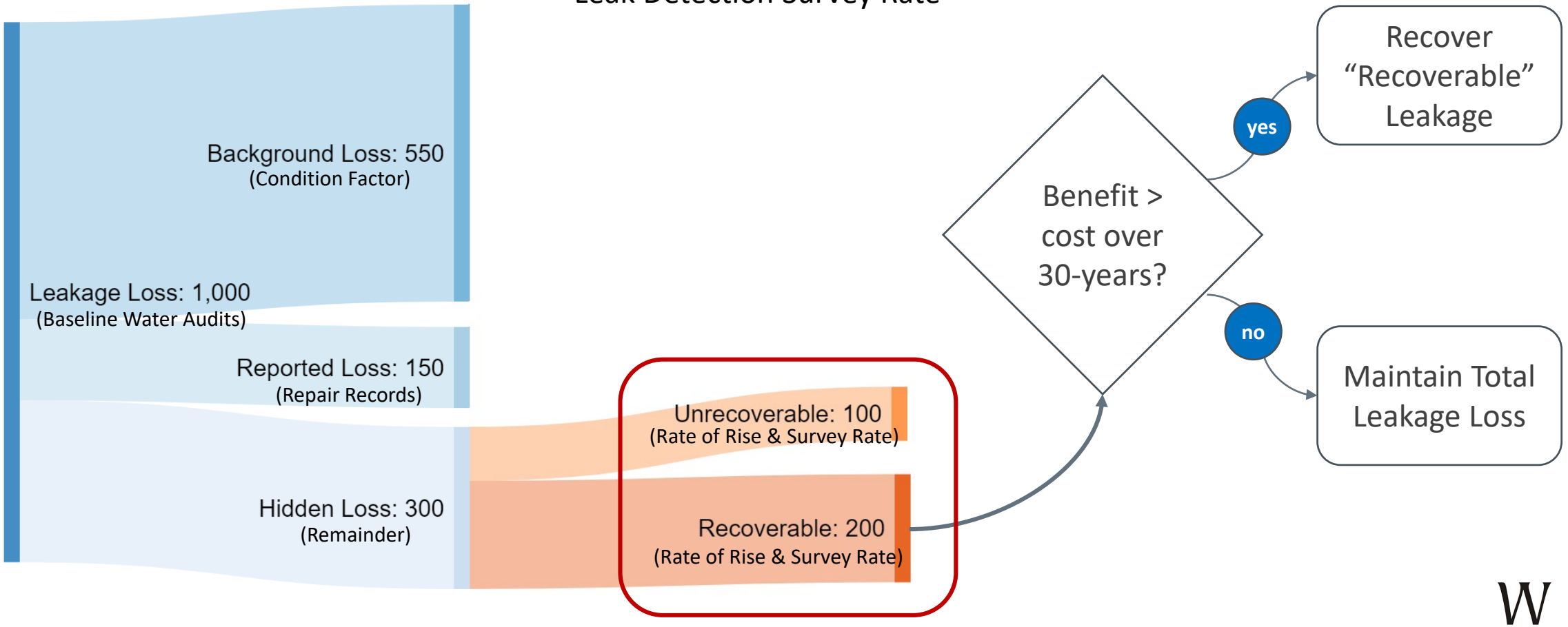
Performance Target Framework (April 2021 Release)

Component Analysis

30-Year Loss Rate & Cost Projection

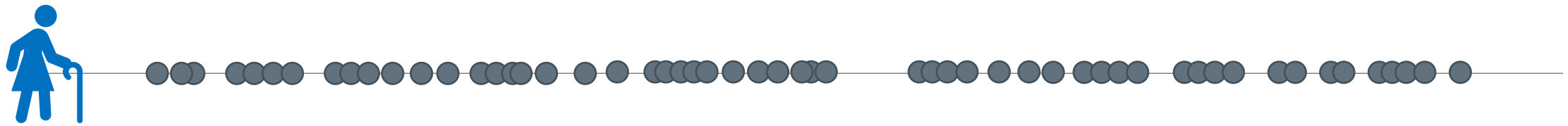
Assuming “Reasonable” Leak Detection Survey Rate

Target Determination

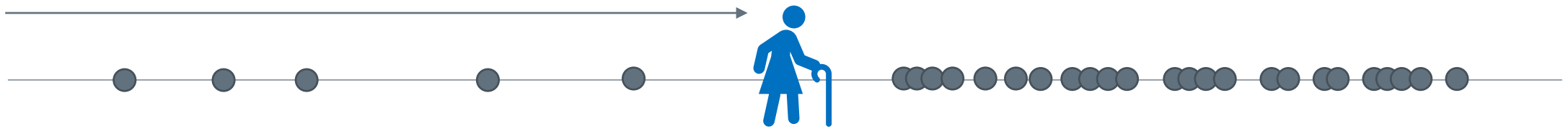


“Equilibrium” Unreported Loss Rate

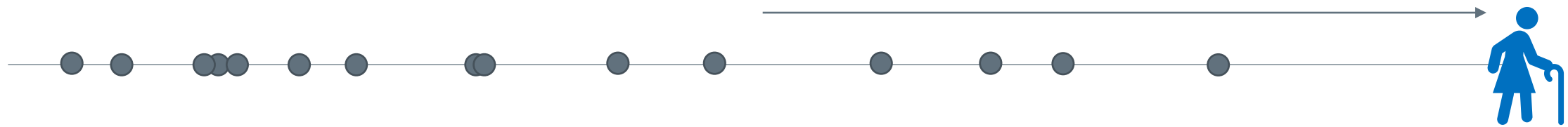
Time = 0



Time = 1/2 Survey



Time = 1 Full Survey



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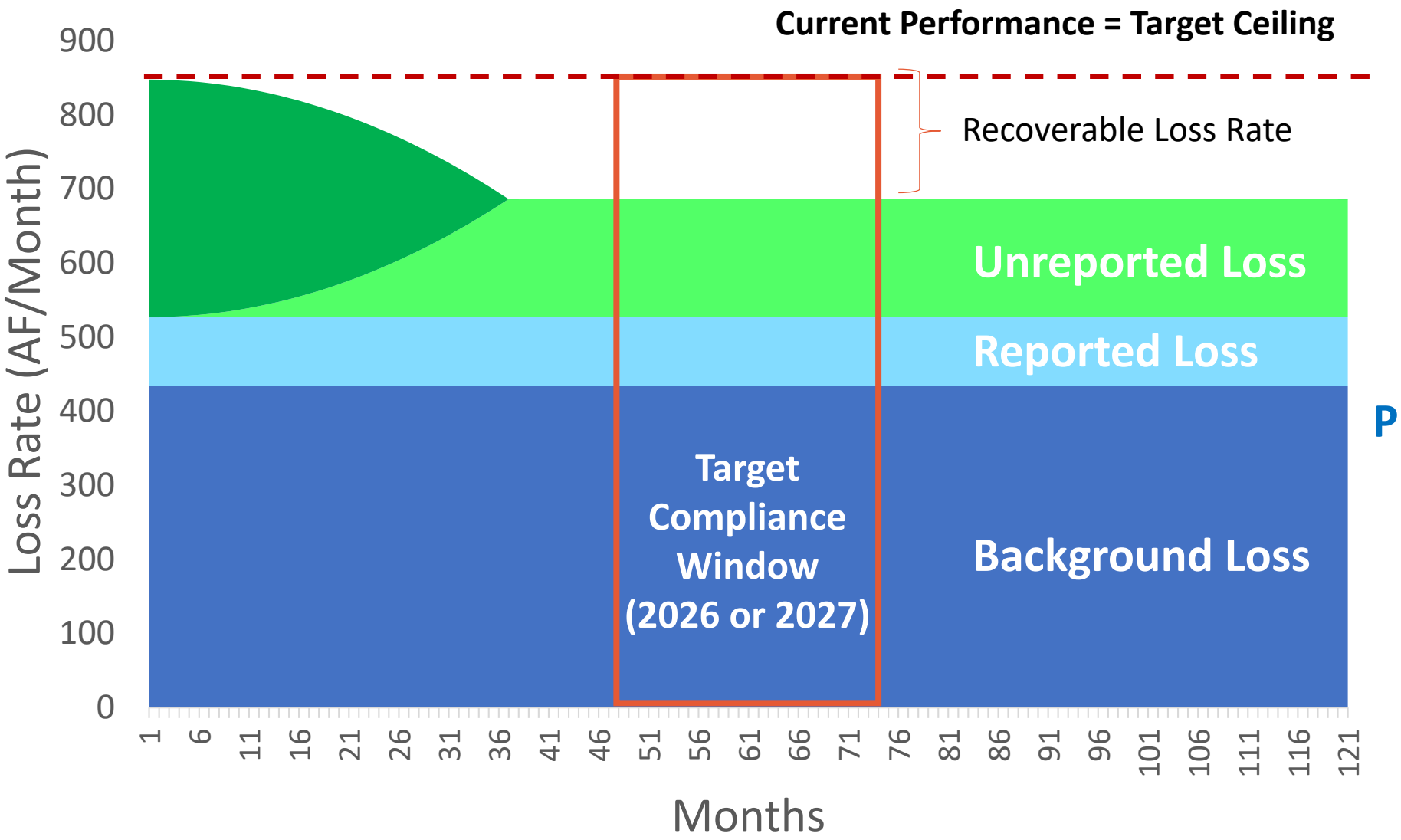
Loss Projection



Benefits & Cost Projected & Discounted . . . 30-years . . .

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Visualizing Impact of Selected Input Parameters

SWRCB Performance Target Model

Reload Default Values

Initial Water Audit Entries | Sliders

Enter the five values below to initialize the model. These parameters can be altered using the sliders on the next tab.

Agency to Initialize Values

Adelanto City Of

Average Baseline Loss

450.3

Miles of Mains

130.6

Count of Service Connections

8194.3

Variable Production Cost ($/AF)

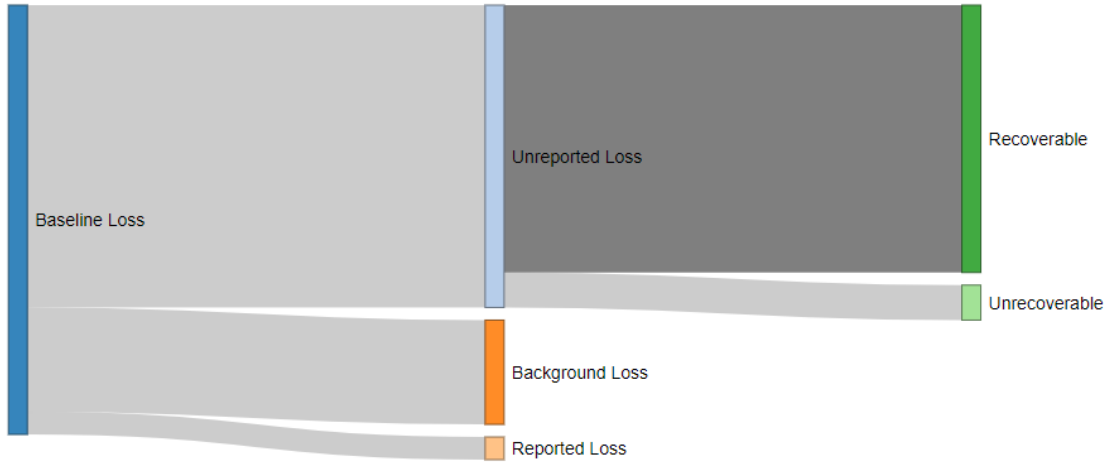
903.9

Average Operating Pressure (PSI)

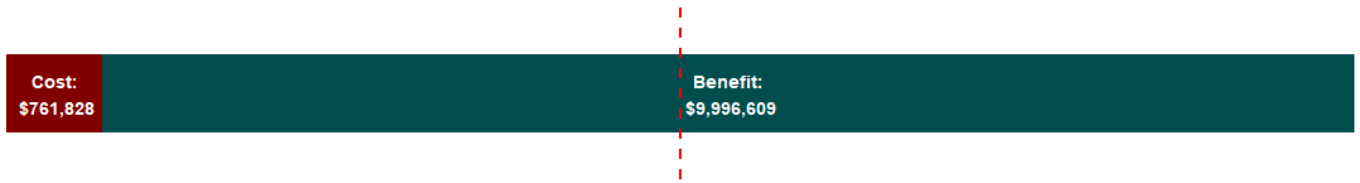
73

Model Outputs | Univariate Sensitivity Analysis | Bivariate Sensitivity Analysis

Real Loss Component Analysis



Cost-Benefit Balance Projected Over 30-Years



Selected Model Outputs

49.1	18.5	170
Current Normalized Performance	Normalized Target	Volumetric Target (AF)

Background Loss - Condition Factor

Potential Impact:

↑ Condition Factor

↑ Target

*(if 30-year net benefit > 0)

Data Requirements:

Option One:

☐ Pipe segment level age and length data.

Option Two:

☐ Total real loss volume, miles of mains, count of service connections, average operating pressure.

Option Three*:

☐ Complete comprehensive leak detection to estimate presence and size of hidden backlog.

Known Issues:

- Biggest fudge factor in modeling exercise

*option 3 not explicitly described as an option in SWRCB adjustment guidance document

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Reported Leakage – Repair Data

Potential Impact:

↑ Reported leakage

↑ Target

*(if 30-year net benefit > 0)

Data Requirements:

- ☐ Count of **main & service** leaks each year for 2017-2020
- ☐ Logs of average time to shut off flow for **main & service** leaks 2017-2020 (response duration)
- ☐ Flow rate estimates for **main & service** leaks 2017-2020 (ideally based on orifice size & local pressure)

Known Issues:

- Does not include leaks other than main and services.
- Does not include leak runtime before utility is aware of a leak

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Guidance for Adjustment Filing

Simplified Timeline

Now! Through 45-Day Formal Rulemaking
(Winter 2022?)

• • •

Formal Adjustment Window
(July 2023)

Considering Adjustments

First…
What inputs are worth pursuing?

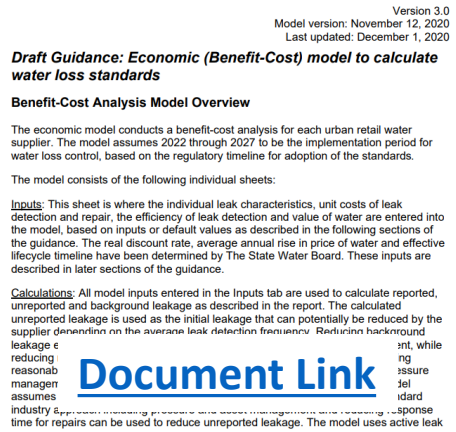
What additional data must be collected to justify an adjustment to worthy inputs?

Types of data that may be useful:

- Leak repair data
- Proactive leak detection results
- Baselining audit input changes

Reference Document

Most recent SWRCB definitions of acceptable adjustment derivations



Version 3.0
Model version: November 12, 2020
Last updated: December 1, 2020

Draft Guidance: Economic (Benefit-Cost) model to calculate water loss standards

Benefit-Cost Analysis Model Overview

The economic model conducts a benefit-cost analysis for each urban retail water supplier. The model assumes 2022 through 2027 to be the implementation period for water loss control, based on the regulatory timeline for adoption of the standards.

The model consists of the following individual sheets:

Inputs: This sheet is where the individual leak characteristics, unit costs of leak detection and repair, the efficiency of leak detection and value of water are entered into the model, based on inputs or default values as described in the following sections of the guidance. The real discount rate, average annual rise in price of water and effective lifecycle timeline have been determined by The State Water Board. These inputs are described in later sections of the guidance.

Calculations: All model inputs entered in the Inputs tab are used to calculate reported, unreported and background leakage as described in the report. The calculated unreported leakage is used as the initial leakage that can potentially be reduced by the supplier depending on the average leak detection frequency. Reducing background leakage e… …nt, while reducing … …ng reasonab… …ssure managem… …del assumes … …ndard industry e… …sponse time for repairs can be used to reduce unreported leakage. The model uses active leak

Document Link

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Thank You!

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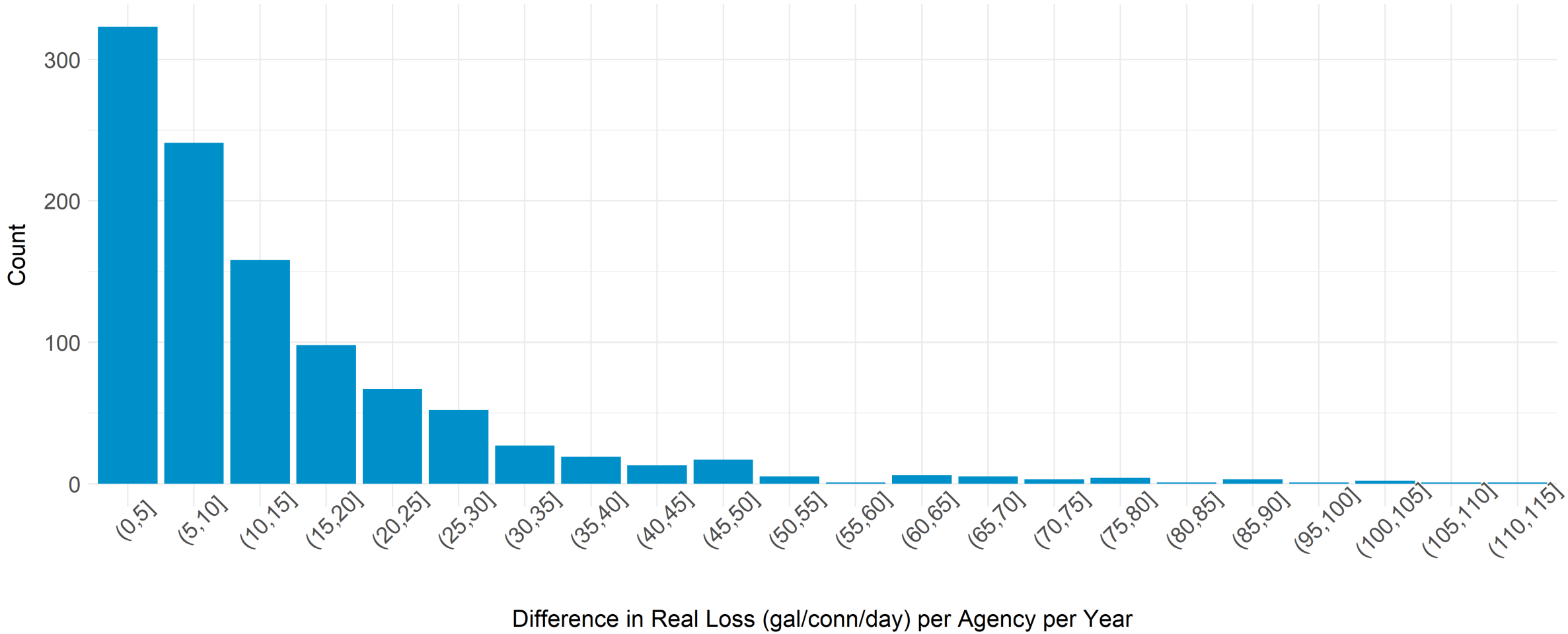
Real Loss Variability Year to Year



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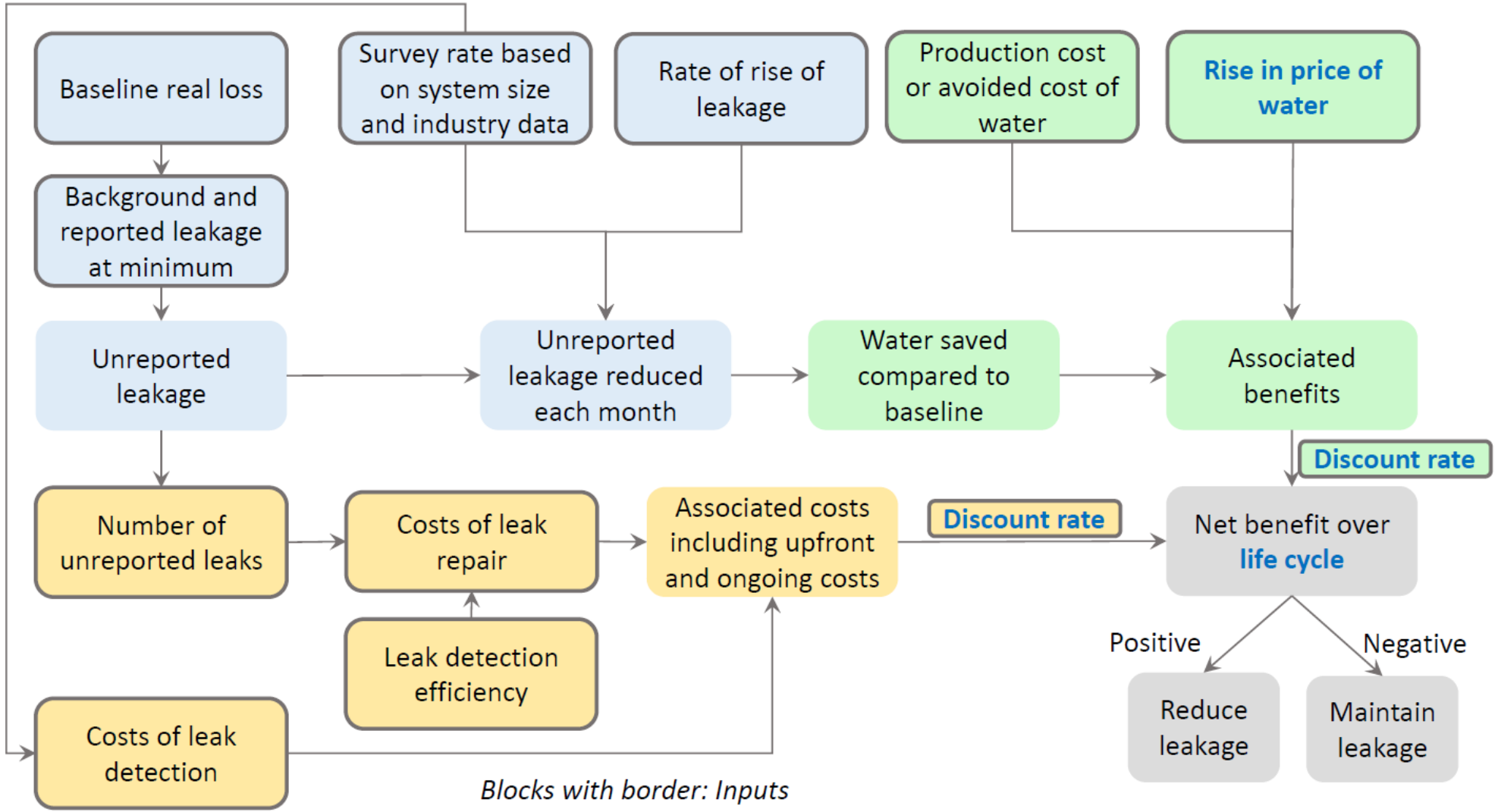
SWRCB Documentation – Complicated!



Blocks with border: Inputs
*Blocks with **blue text**: State Water Board determined inputs*

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