

Utah's Regional M&I Water Conservation Goals



Rachel Shilton, P.E.
Utah Division of Water Resources

Steven C. Jones, P.E.
Hansen, Allen & Luce

Utah Water Users Workshop
St. George, UT
March 2019



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Welcome.

I hope you are here because you are anxious to learn about the Regional Water Conservation Goals proposed for 2030.

I am Rachel Shilton, the Division manager for this project

Steve Jones from Hansen, Allen and Luce Engineers is the consultant project lead

He will be presenting information about the **2030** Regional Water Conservation Goal Report

I appreciate the time and effort our consulting engineers dedicated to this project

This presentation will be available.



HOME BOARD ▾ INTERSTATE STREAMS ▾ DIVISION SECTIONS ▾ WATER DATA ▾ STATE OF UTAH WATER PROJECTS ▾



<https://water.utah.gov/>
waterwise@utah.gov

MISSION: PLAN, CONSERVE, DEVELOP AND PROTECT UTAH'S WATER RESOURCES



<https://water.utah.gov>

Utah Division of Water Resources

The Utah Division of Water resources is one of the seven division's housed within the [Department of Natural Resources](#). Tasked with Planning, Conserving, Developing and Protecting Utah's Water Resources, the Division earnestly strives to be Utah's water steward.

Utah is a semi-arid state and its water future is one of the most significant challenges facing us today. The State of Utah and the Division recognize the vitality in finding sustainable solutions to ensure Utah families have reliable water, that agriculture and businesses can be successful and that the environment can prosper.



This presentation will be available.



This presentation will be available to you

The Division of Water Resources website is currently under construction, however, the information in this presentation will be posted

Our website is found at: <https://water.utah.gov/>

Additionally, you can request a copy from waterwise@utah.gov and I will send the information to you

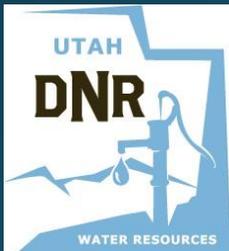
Division of Water Resources

Mission:

Plan, conserve, develop, and protect Utah's water resources

Project Purpose:

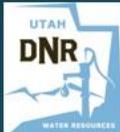
Propose regional boundaries, goals, and practices for M&I water conservation



Division of Water Resources

Mission:

Plan, conserve, develop, and protect Utah's water resources



Project Purpose:

Propose regional boundaries, goals, and practices for M&I water conservation



Developing regional water conservation goals is consistent with the Division's mission to conserve water

PLAN, CONSERVE, DEVELOP, AND PROTECT UTAH'S WATER RESOURCES

Utah's Regional M&I Water Conservation Goals

February 2019



DRAFT

Prepared for:



Prepared by:





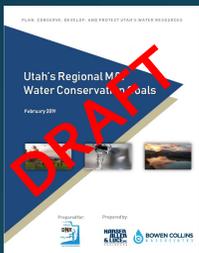
This information presented today is **draft**.
I can't emphasize that word enough...
This information is still draft and is subject to change.

Regional Water Conservation Goal Report

✓ Municipal water use

2030 Goals

2040 and 2065 Projections



Regional Water Conservation Goal Report

✓ Municipal water use

2030 Goals

2040 and 2065 Projections



The report presents municipal and industrial water conservation **Goals** to be accomplished by **2030**

It also projects additional water conservation for 2040 and 2065 milestone years

Those projections are too far into the future to be reliable **GOALS**

The projections are presented to show the direction we need to be moving and to remind all of us, that water conservation efforts do not end at 2030

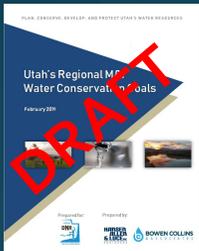
The Division plans to address the next milestone goals every time regional goals are reviewed

There are few topics that are **not** addressed in this **draft** report

Regional Water Conservation Goal Report

✓ Municipal water use

∅ Future supply

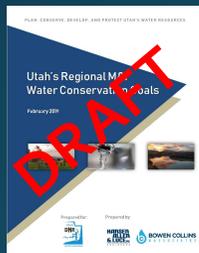


Regional Water Conservation Goal Report

✓ Municipal water use

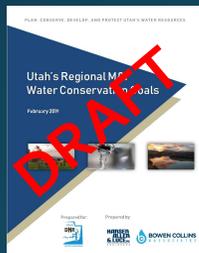
∅ Future supply

∅ New source development



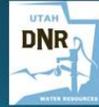
Regional Water Conservation Goal Report

- ✓ Municipal water use
- ∅ Future supply
- ∅ New source development
- ∅ Agriculture water



Regional Water Conservation Goal Report

- ✓ Municipal water use
- ∅ Future supply
- ∅ New source development
- ∅ Agriculture water



This plan does not address:

- Future Water Supply and reliability

- How to determine projected water supply

- Neither projects nor source development are discussed

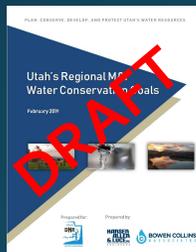
- Agriculture water use and converting agriculture water to urban uses are topics for later discussions

This report focuses on regional goals out to the year 2030 in order to conserve municipal and industrial water to provide the current supply to as many users as possible

Why now?

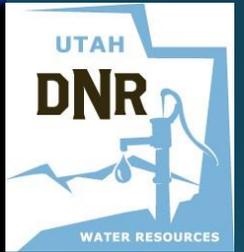
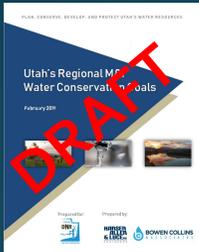
Current Goal established by Governor Herbert is: reduce water use 25% by 2025
That goal represented 1% per year reduction for 25 years
It is not yet 2025, so why change the goals now?

Many of you know the answer:
Statewide, M&I use has declined by at least 18% since 2000



Why now?

Celebrate success!!



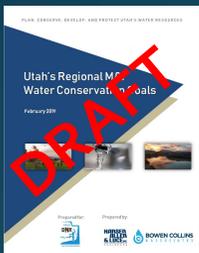
Why now?



- Because some communities have already reduced their water use by 25% or more
- We want to celebrate their success
- We want to acknowledge that these practices work
- We recognize that real people are making a real difference in water use

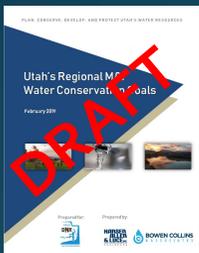
Why now?

- Celebrate success
- Comply with 2015 Legislative Audit Report (15-01)



Why now?

- Celebrate success
- Comply with Legislative Audit Report 15-01
- Promote future conservation



Why now?

- Celebrate success
- Comply with Legislative Audit Report 15-01
- Promote future conservation



Legislative Audit Report 15-01 recommended regional goals;

Although the audit was difficult, I personally appreciate the effort that went into making it meaningful

The division took the recommendations seriously; acted on many and are still working on implementing others

Establishing regional water conservation goals specific to different areas of the state rather than one state wide goal was one of the audit recommendations

Encourage more focus on conservation **today**, while promoting additional future conservation

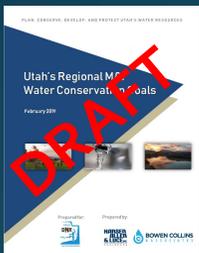
We want to keep the momentum going

We recognize that implementing conservation practices early saves more water and money

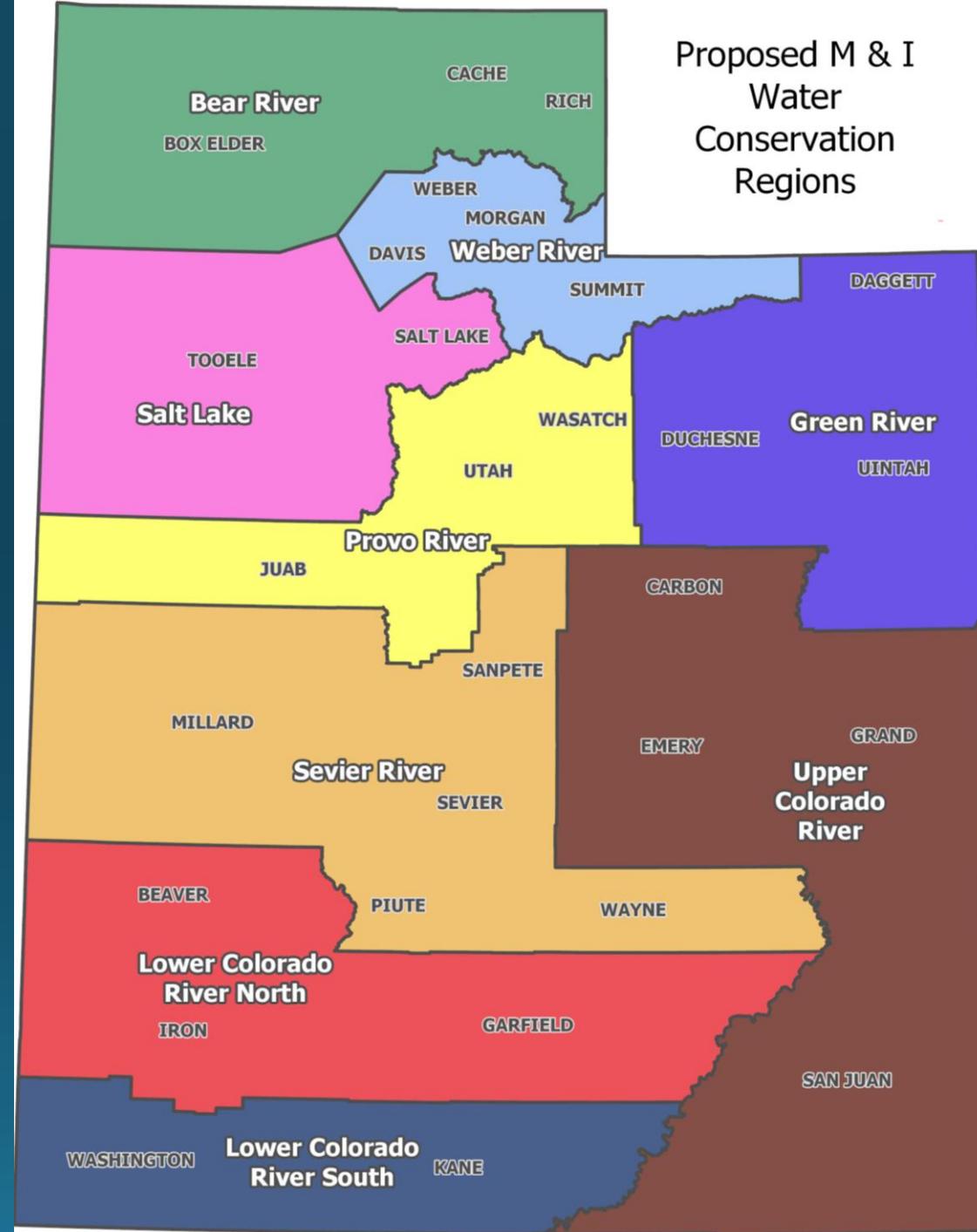
When communities begin development with conservation practices in place, it is less expensive than retro-fitting existing structures and infrastructure

So....

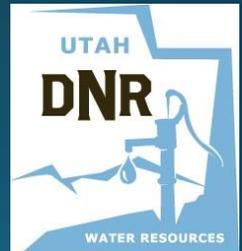
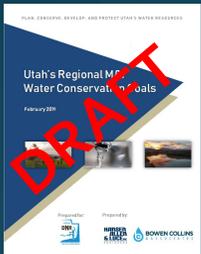
What's different?



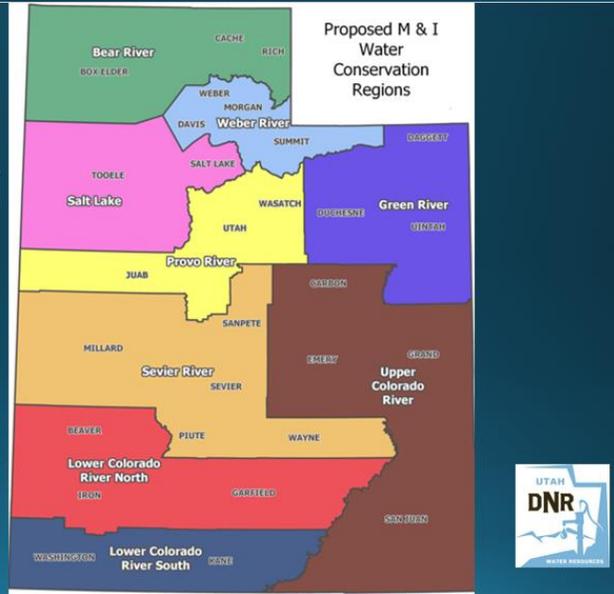
9 Water Conservation Regions



Proposed M & I
Water
Conservation
Regions



9 Water Conservation Regions



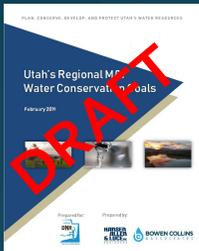
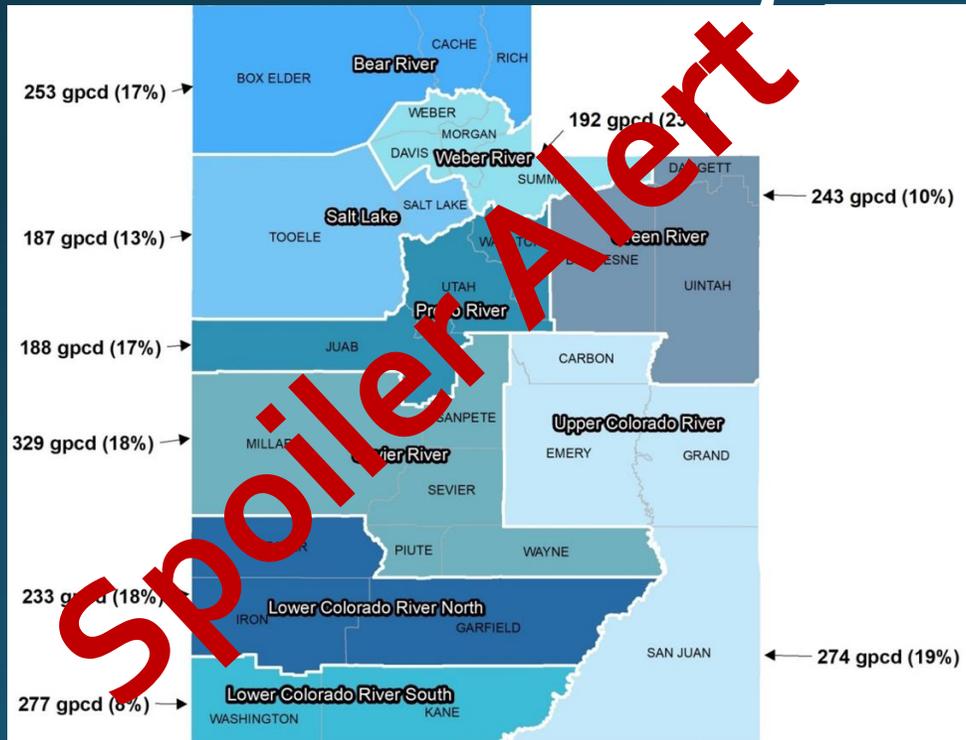
Regions were define which are consistent with the Board of Water Resources River Districts
Are these perfect boundaries?

No

However, these region boundaries do align well with the past water use and water conservation progress

What else is different?

✓ Goals are customized for each region



What else is different?

✓ Goals are customized for each region

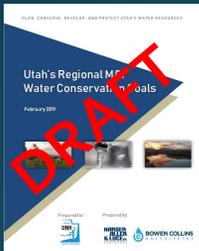


Up next, Steve Jones, from Hansen, Allen and Luce Engineers, will describe how the goals were set

What else is different?

- ✓ Goals are customized for each region
- ✓ Deeper commitment to water conservation

∅ Wasteful water practices



What else is different?

- ✓ Goals are customized for each region
- ✓ Deeper commitment to water conservation



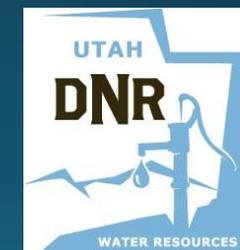
∅ Wasteful water practices



- We want to keep water conservation momentum going
- We want water conservation to be a **way of life** instead of a **sacrifice**
- We want to end wasteful water use practices at every level
- We want to preserve quality drinking water for culinary water uses



**WE NEED YOU
TO CONSERVE WATER**





WE NEED YOU
TO CONSERVE WATER



The **next levels** of commitment requires **all** of us: Every Utahan to accept, commit to, **support** and take steps to conserve water
Now, Steve Jones with Hansen, Allen and Luce Engineers will present the Regional Water Conservation **Goals for 2030**

Utah's Regional M&I Water Conservation Goals



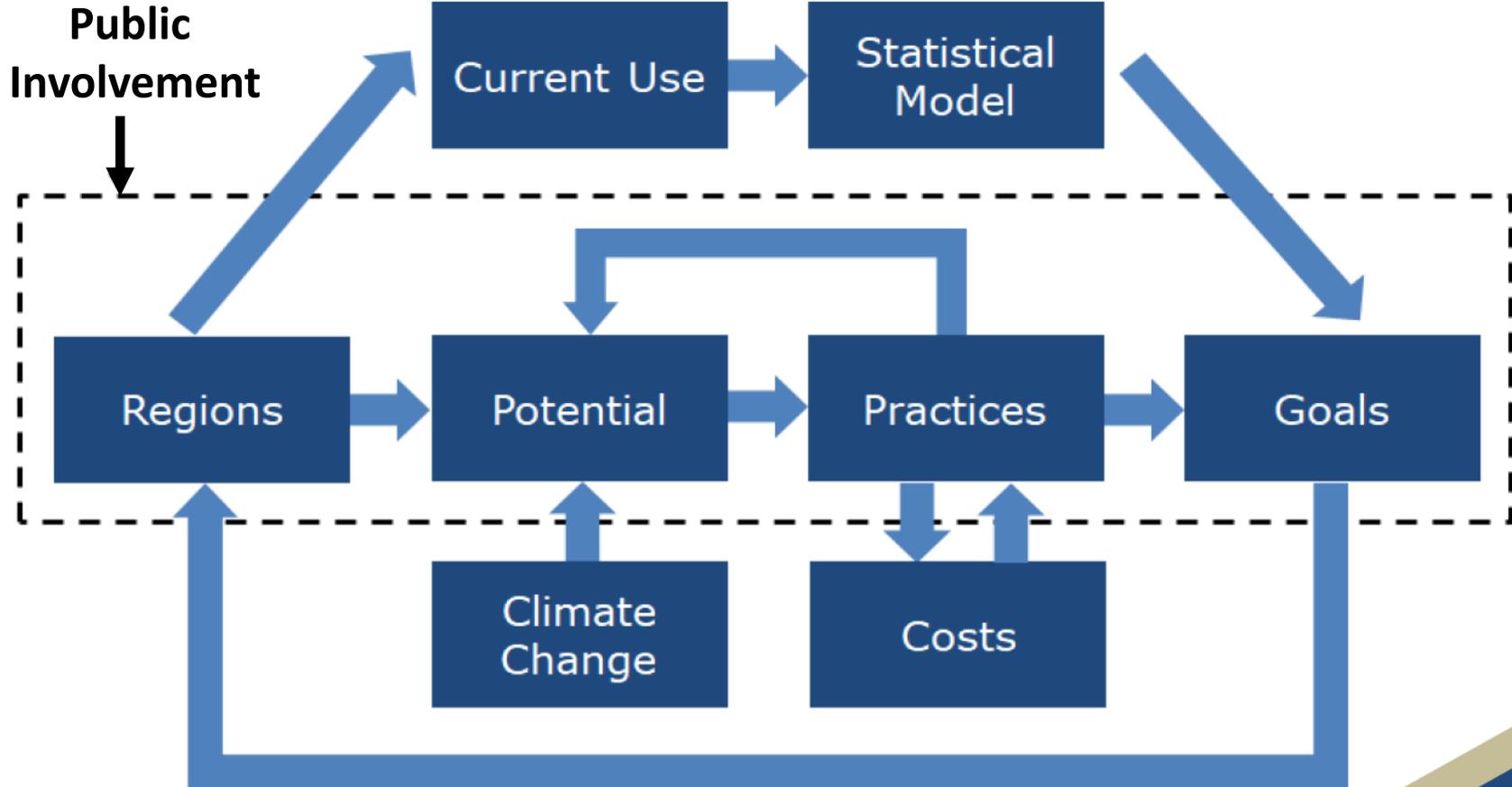
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Goal Development Process



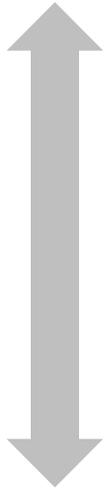
Public Involvement

Broad and Brief

Online Survey

Open Houses

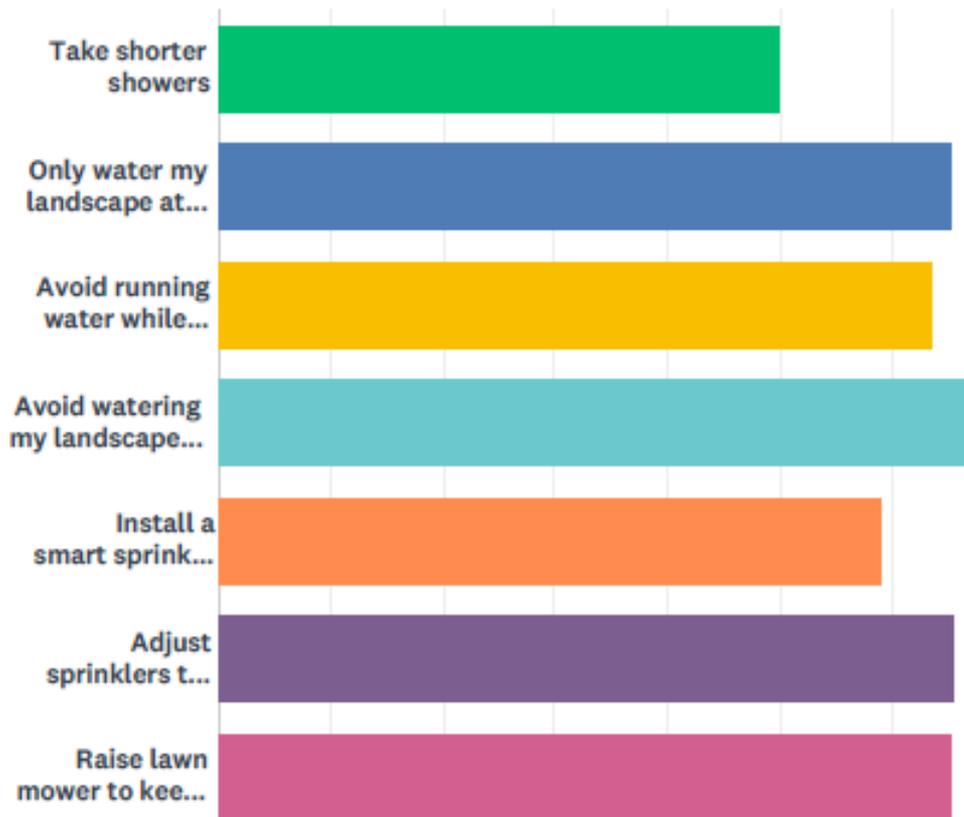
Stakeholder
Interviews
and Draft
Reviews



Deep and Focused

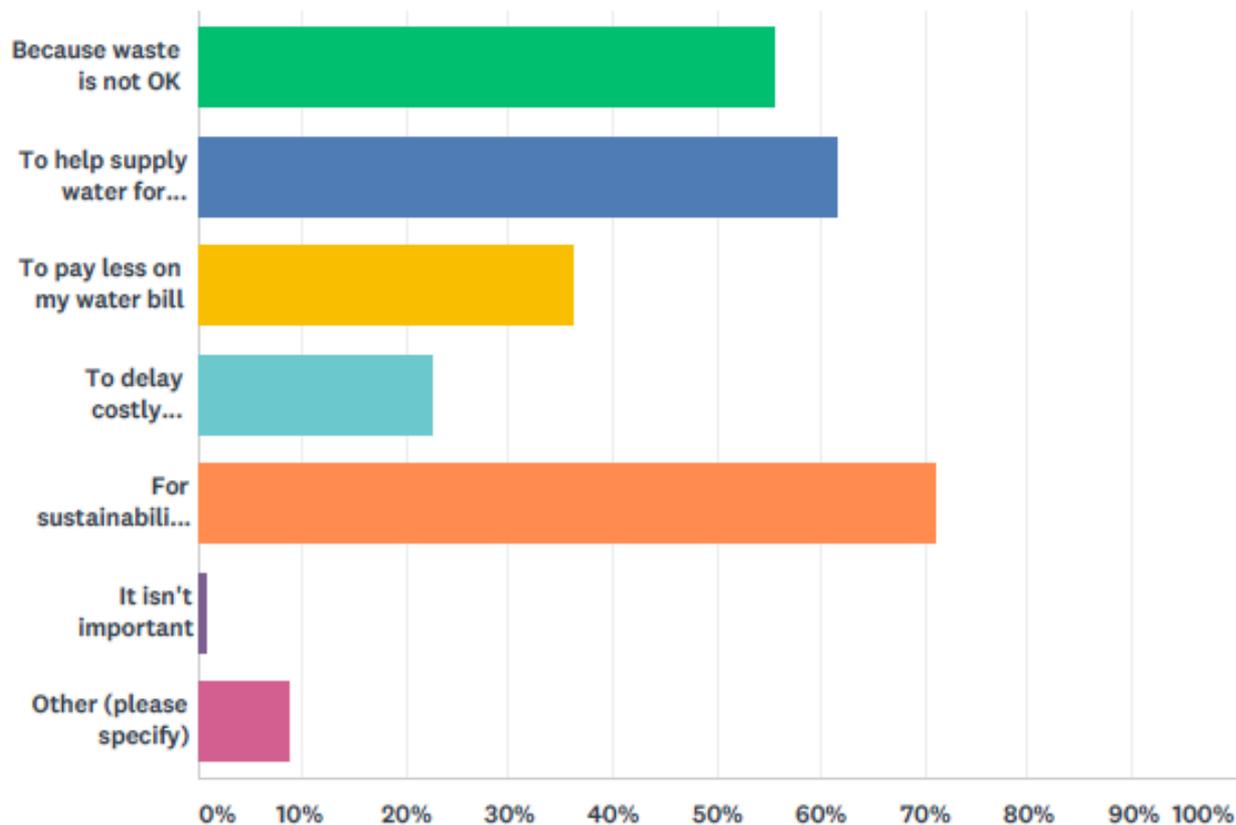
Q12 On a scale of 1 to 7, where 1 is very unwilling and 7 is very willing, how willing are you to do the following to become more efficient?

Answered: 1,407 Skipped: 248



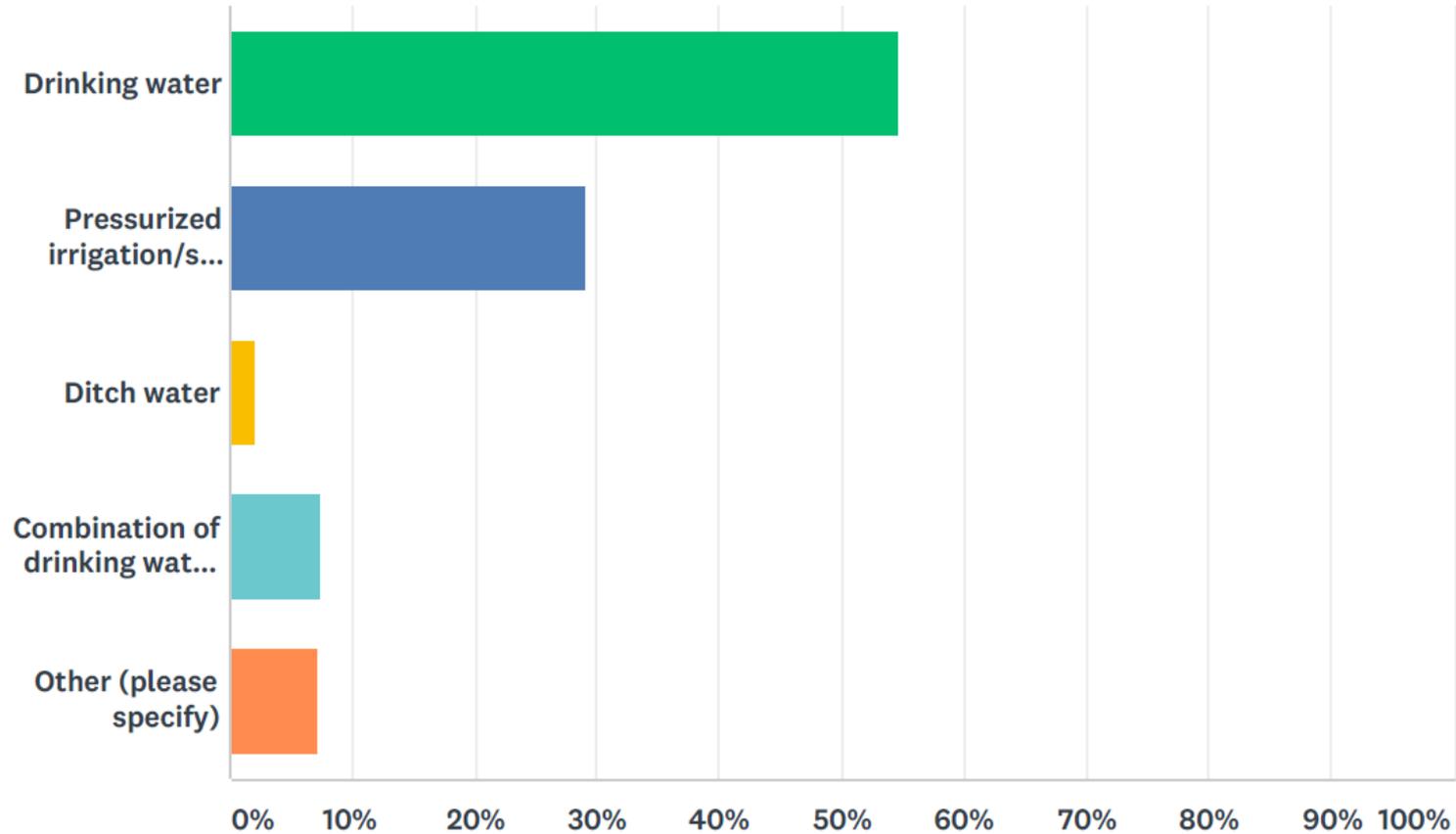
Q9 Why is it important to use water efficiently?

Answered: 1,402 Skipped: 253



Q6 What source of water do you use to irrigate your landscape?

Answered: 1,646 Skipped: 9



Open Houses



OUTDOOR WATER USE PROJECTIONS FOR DIFFERENT DEVELOPMENT PATTERNS

Past Practices

Scenario 1

Scenario 2

Scenario 3



- Traditional Landscaping – 80% turf 20% planting beds and hardscaped areas.
- Historic irrigation efficiency = 50% (Double the amount needed)

- Traditional Landscaping – 80% turf 20% planting beds and hardscaped areas.
- Increased irrigation efficiency to 70%

- 50% turf 50% planting beds and hardscaped areas.
- Increased irrigation efficiency to 80%.

- 20% turf 80% planting beds and hardscaped areas.
- Increased irrigation efficiency to >80%.



INDOOR WATER USE PROJECTIONS FOR DIFFERENT DEVELOPMENT PATTERNS



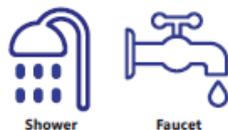
Past Practices

- Water use averages prior to 2000.
- Limited use of high efficiency fixtures and appliances.



Scenario 1

- 40% conversion to high efficiency fixtures and appliances.



Shower

Faucet



Scenario 2

- 80% conversion to high efficiency fixtures and appliances.



Clothes Washer



Shower



Faucet



Toilet



Dish Washer



Scenario 3

- 100% conversion to high efficiency fixtures and appliances.
- Elimination of leaks.
- Improved awareness and focus on water conservation.



Clothes Washer



Shower



Faucet



Toilet



Dish Washer



Leak



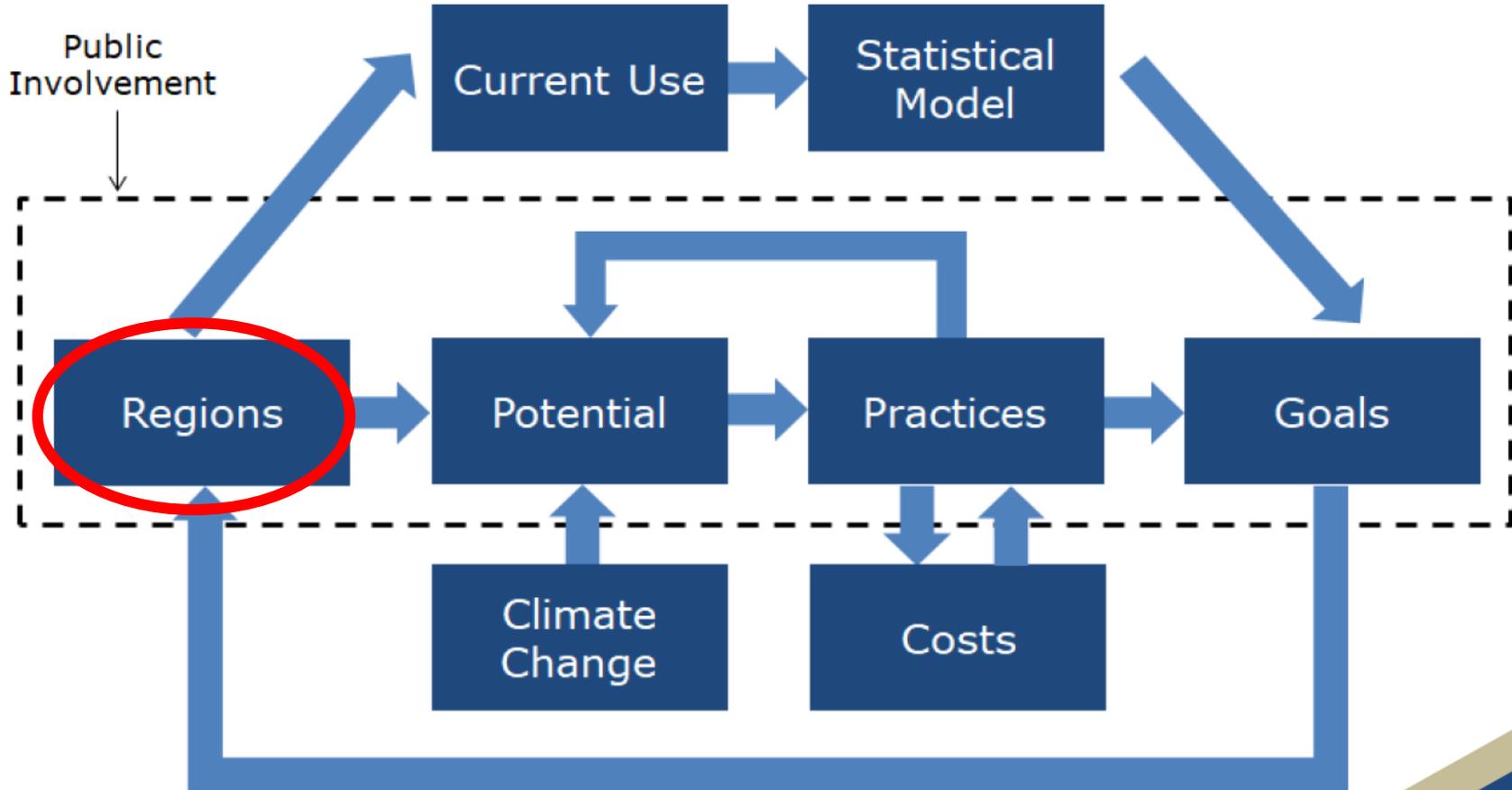
Other

Source: Water Research Foundation

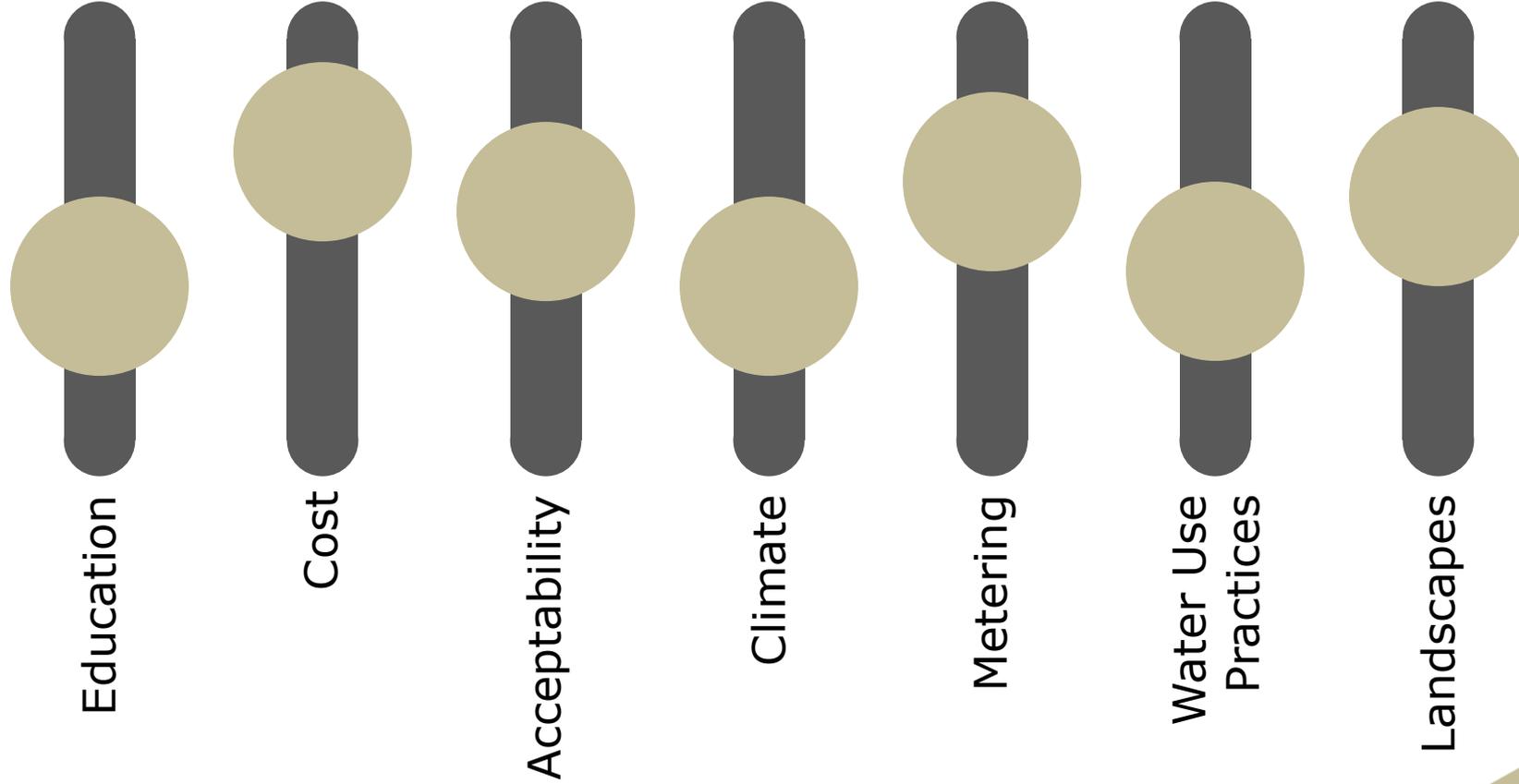
Open House and Stakeholder Concerns:

- Landscaping practices
 - Water use culture
 - The goals are too aggressive or not aggressive enough
 - Water use data management
 - Cost and funding for conservation and water supply
 - Water supply limitations
 - Water rates
 - Credit for past water conservation efforts
- 

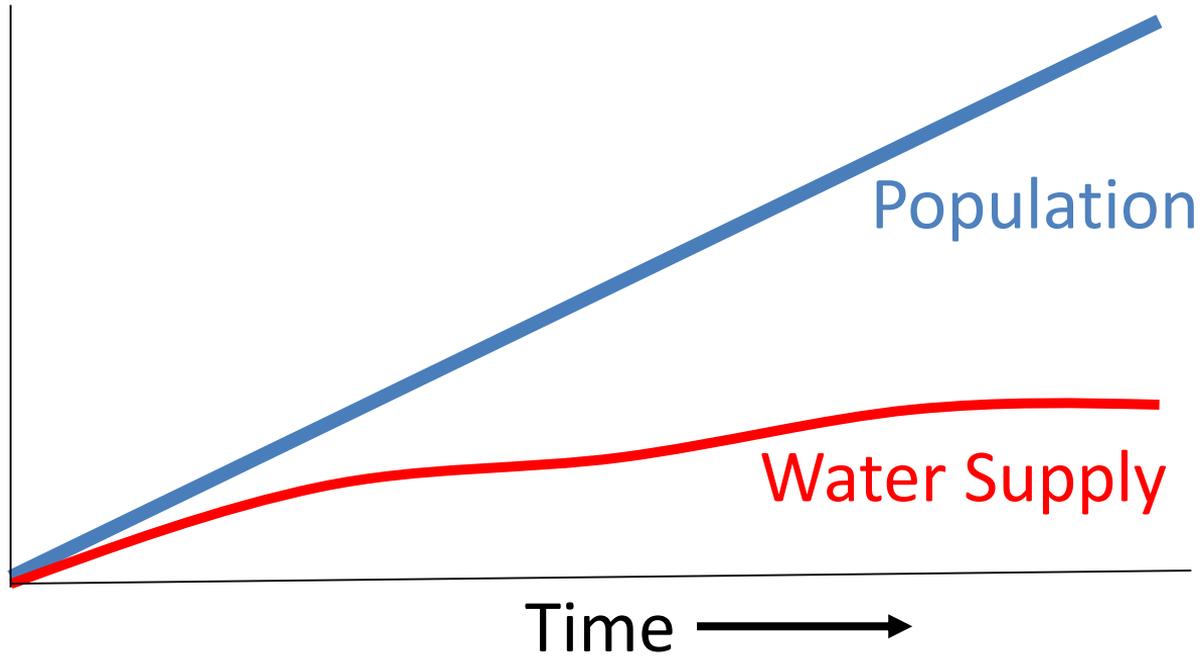
Goal Development Process



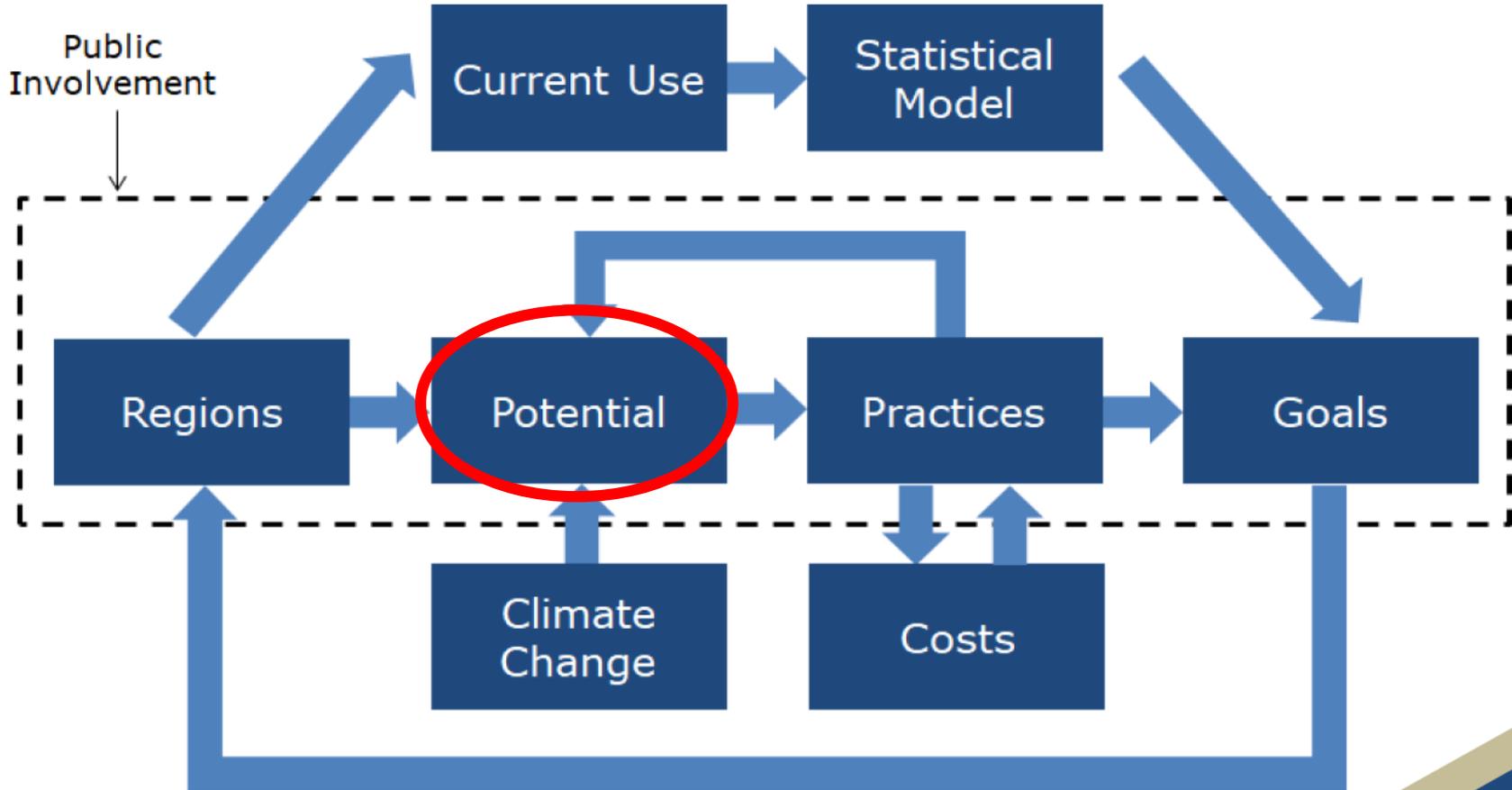
Potential Conservation Model



Population vs. Water Supply Over Time



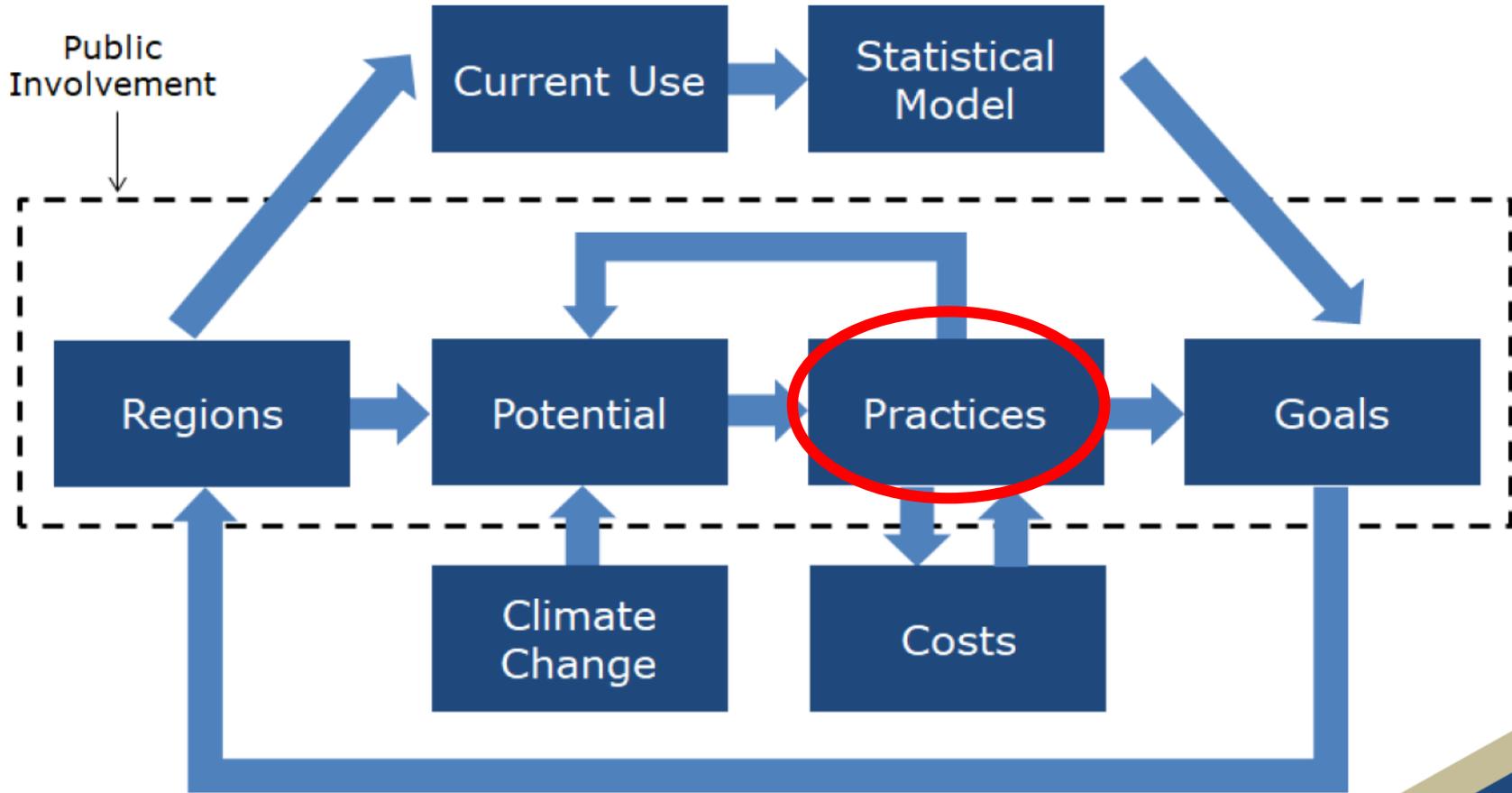
Goal Development Process



Potential

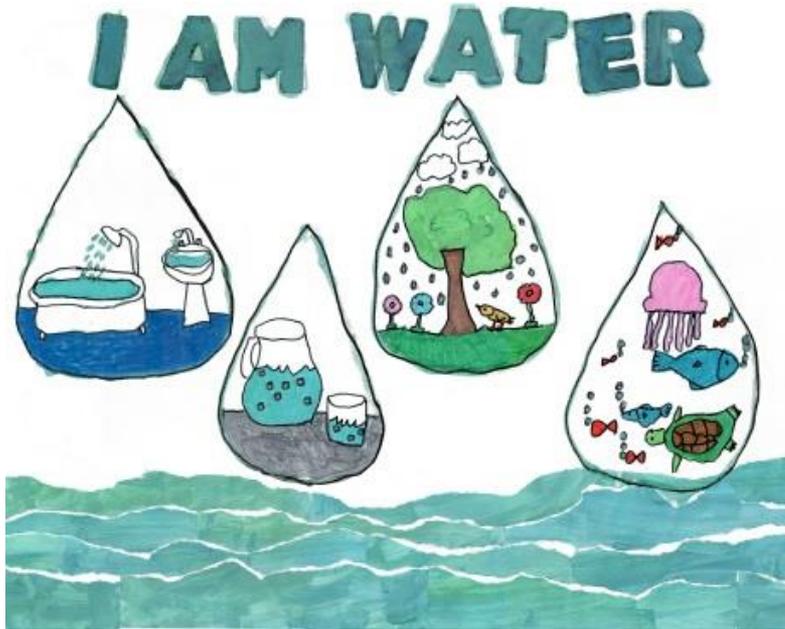
- Population growth
 - Development density increase
 - Landscape change
 - Increase in indoor efficiency
 - Increase in irrigation efficiency
- 

Goal Development Process



Practices

GENERAL



Education

Pricing

- Lower base rates
- Increase tiers for usage
- Review funding sources
- Use customer feedback technology.

Practices

INDOOR



Fixture and appliance conversion

Fix indoor leaks

Change in indoor water use habits

Practices

OUTDOOR



Improved irrigation efficiency

- Secondary metering
- Smart irrigation controls
- Drip irrigation systems

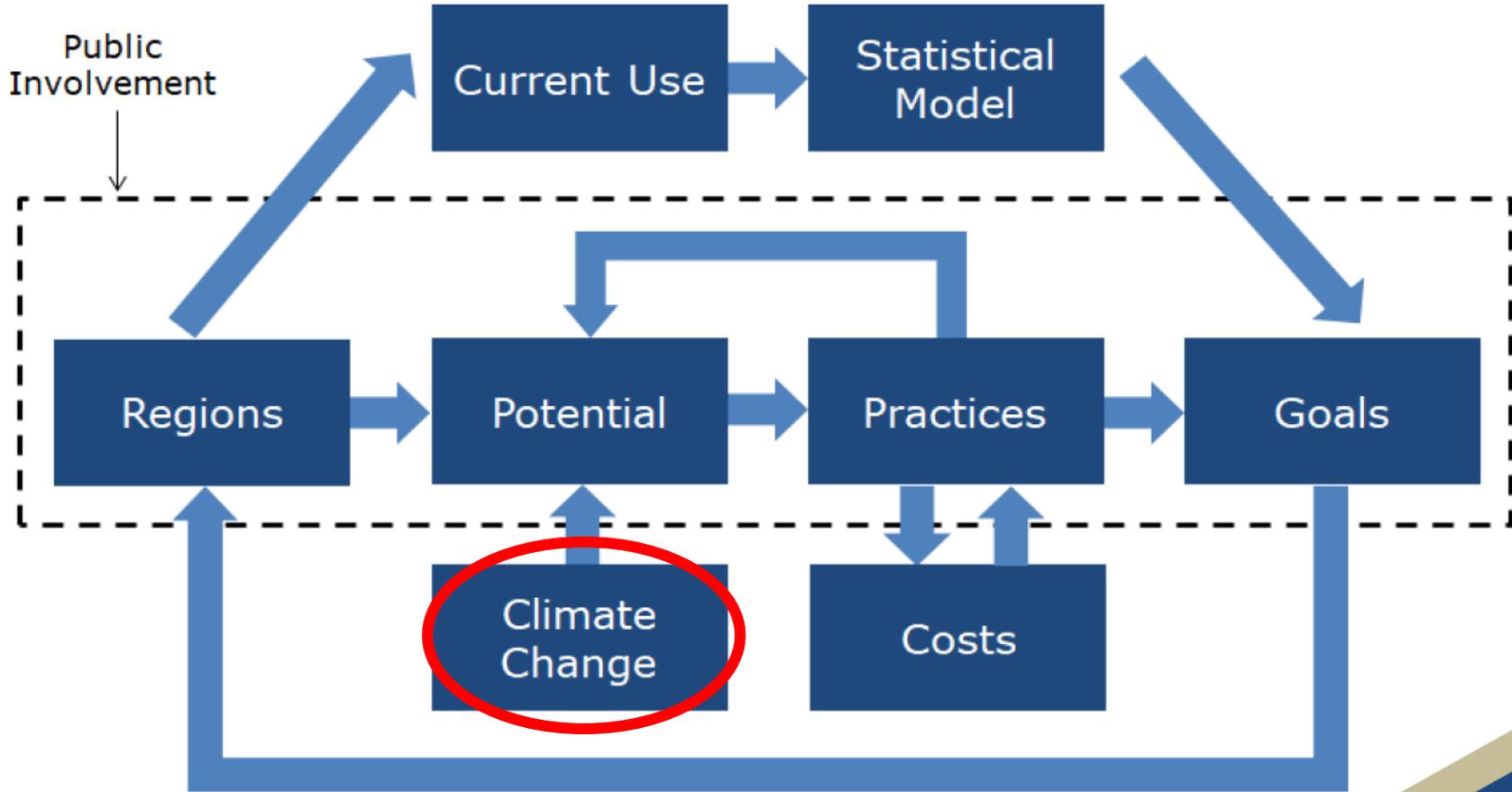
Water-wise landscaping

- Water-wise new construction
- Convert existing landscapes

Lot size and density guidelines

- Smaller lot sizes
- Less irrigated area

Goal Development Process



Climate Change Impacts in Utah by 2050



Temperature
increases by
2.3 °F



Spring runoff
occurs
1 month
earlier

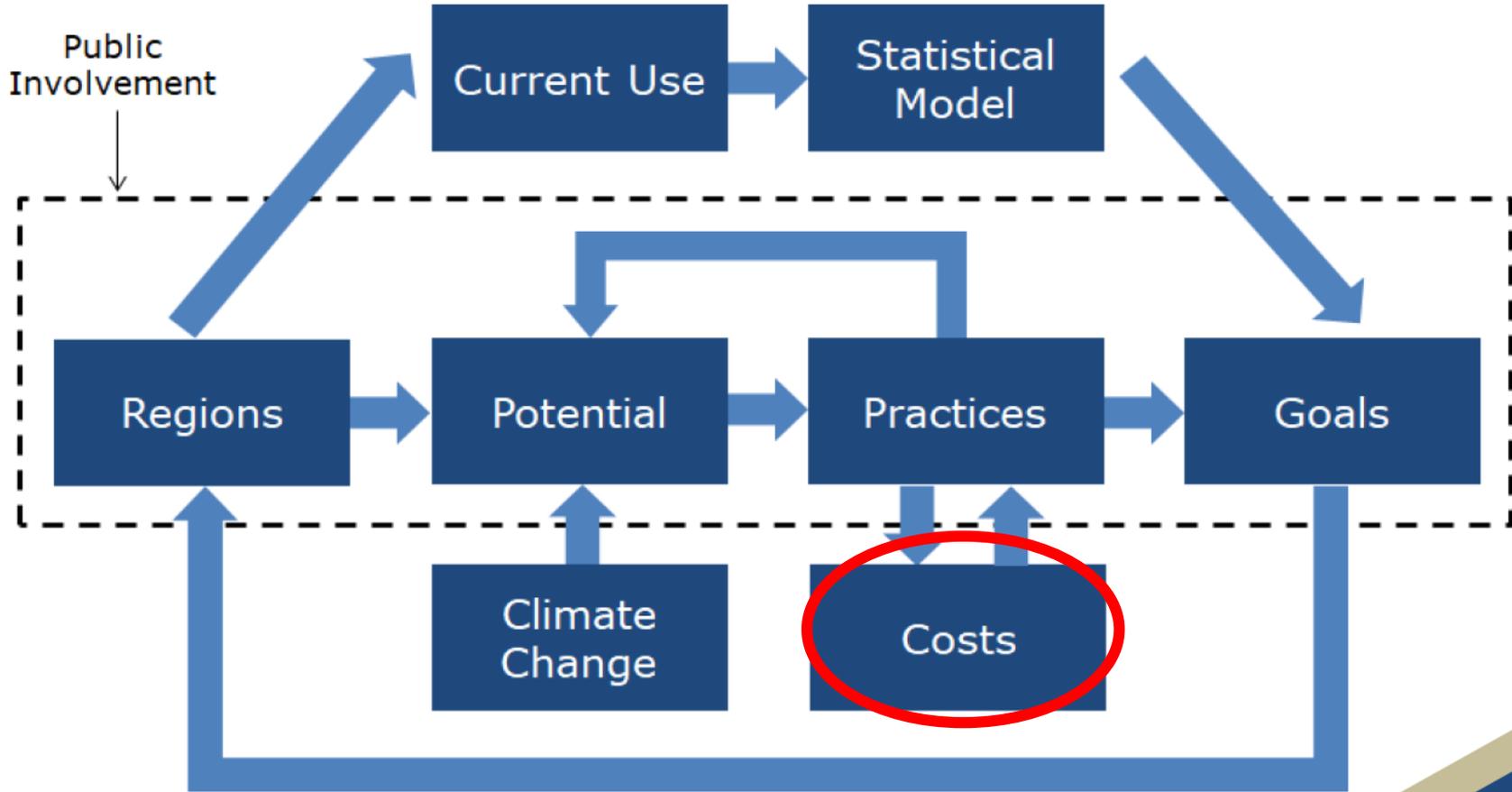


Irrigation
season
lengthens by
8 days



Precipitation
becomes
more rain
and less snow

Goal Development Process



Cost of 2030 Conservation

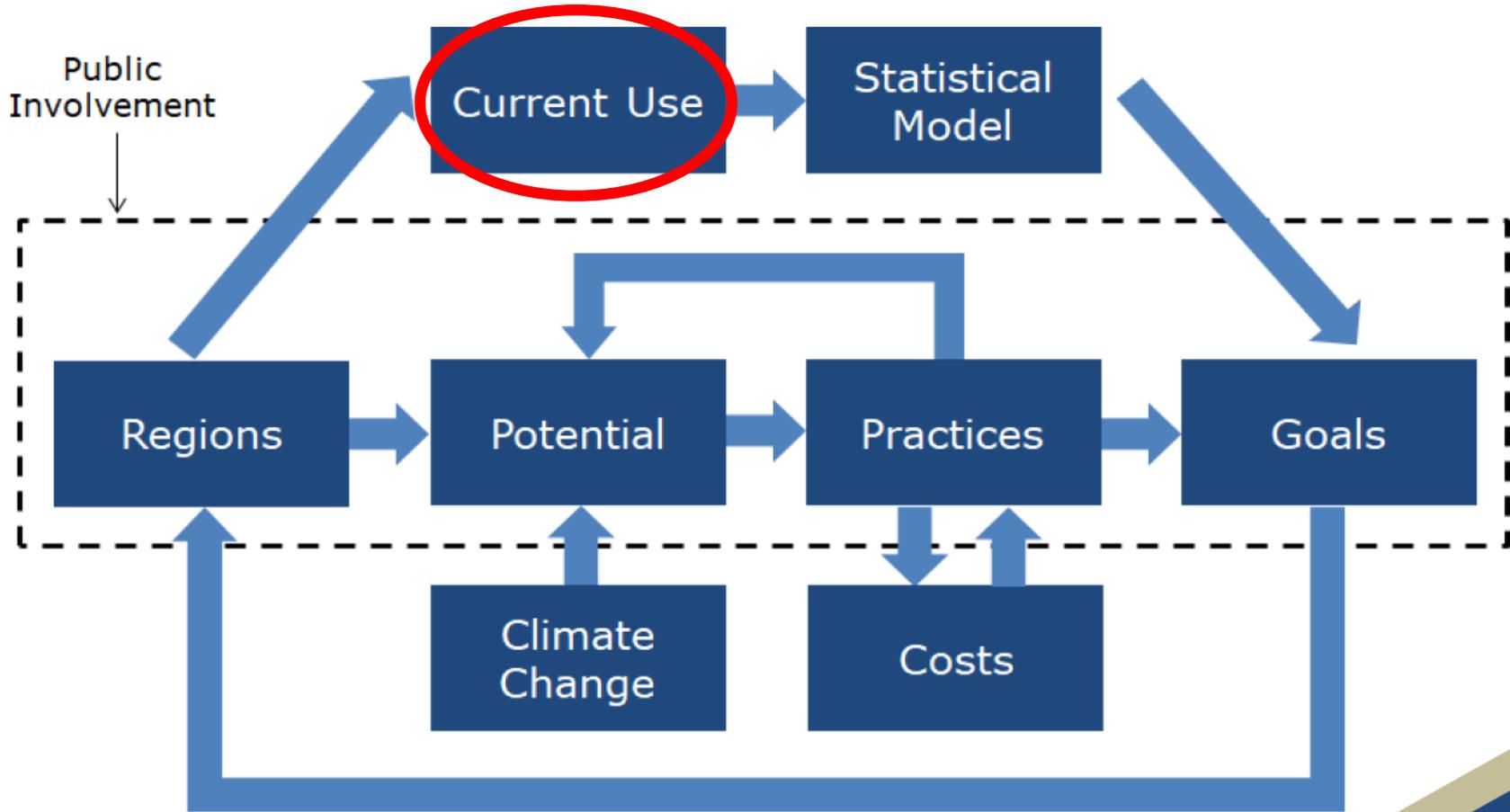
Region	Required Investment in M&I Water Conservation by 2030	Expected Annual Water Savings (ac-ft)	Annualized Unit Cost (\$/ac-ft)
Bear River	\$199,700,000	10,895	\$1,192
Green River	\$37,500,000	2,129	\$1,146
Lower Colorado River North	\$61,900,000	3,641	\$1,106
Lower Colorado River South	\$358,300,000	8,395	\$2,776
Provo River	\$791,800,000	39,281	\$1,311
Salt Lake	\$901,300,000	41,675	\$1,407
Sevier River	\$77,500,000	5,455	\$924
Upper Colorado	\$46,800,000	3,454	\$881
Weber River	\$786,400,000	49,905	\$1,025
Total	\$3.26 billion	164,830	\$1,287

¹ Annualized over 30 years at 5%.

Cost of Future Source Projects

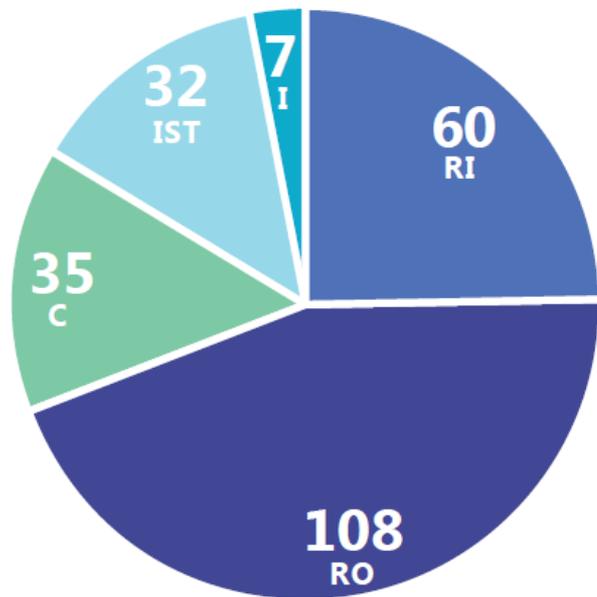
Source	Capital Cost	Yield (ac-ft)	Unit Capital Cost (\$/ac-ft)	Annualized Capital Cost ¹ (\$/ac-ft)	O&M Cost (\$/ac-ft)	Total Cost (\$/ac-ft)
Lake Powell Pipeline	\$1,383,430,000 ²	86,249	\$16,040	\$1,043	\$208 ³	\$1,252
Bear River Pipeline—to JWCD	\$723,260,182 ⁹	50,000	\$14,465	\$941	\$188 ³	\$1,129
Central Water Project ⁴	\$16,736	1	\$16,736	\$1,089	\$156	\$1,245
Reuse—High ^{5,7}	\$56,957,000	4,200	\$13,561	\$882	\$528	\$1,411
Reuse—Low ^{5,7}	\$11,546,000	1,341	\$8,610	\$560	\$258	\$818
Average Sized Municipal Well ⁷	\$8,073,000 ⁸	807	\$10,009	\$651	\$186	\$837
Mixed Portfolio of Local Water Sources ^{6,7}	\$9,900 ⁸	1	\$9,900	\$644	\$117	\$761

Goal Development Process



WHERE ARE WE AT TODAY?

STATEWIDE WATER USE 2015



I Industrial Water Use - Manufacturing, plants, oil and gas producers, mining companies, dairies and stock watering.

IST Institutional Water Use - Various public agencies and institutions (i.e. schools, municipal buildings, churches)

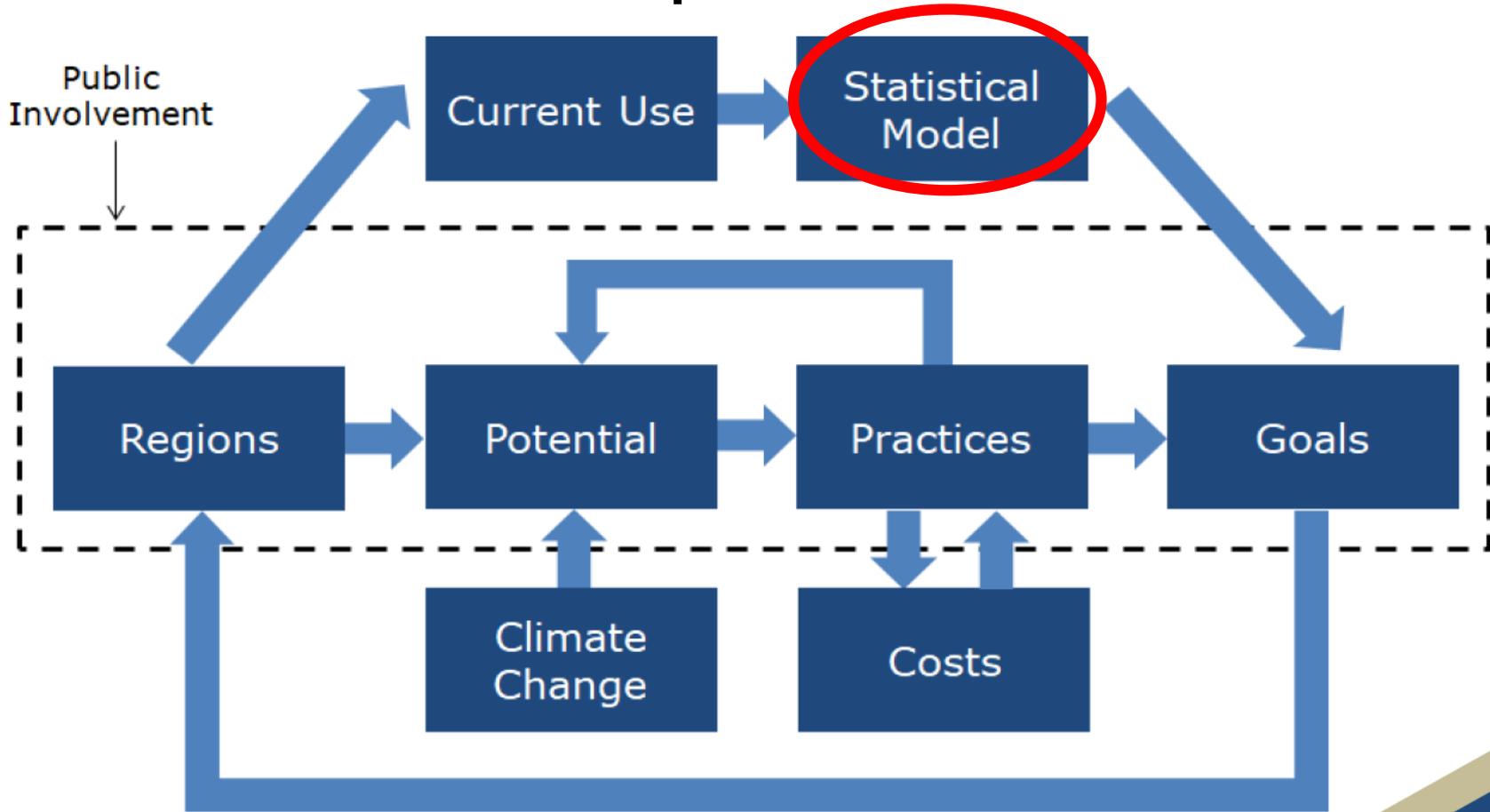
C Commercial Water Use - Office spaces, retail businesses, restaurants and hotels.

RI Residential Indoor Water Use - Residential drinking water, cooking, washing clothes, miscellaneous cleaning, personal grooming and sanitation.

RO Residential Outdoor Water Use - Irrigation of lawns, gardens and landscapes, and other residential activities.

Total - 242 gallons per capita per day(gpcd)

Goal Development Process



Hydraulic and system-specific

- Ratio of public water systems with tiered water rates (individual responses)
- Ratio of public water systems with documented water conservation programs or policies (individual responses)
- Ratio of public water systems with clearly defined water conservation goal (individual responses)
- Ratio of public water systems also covered by secondary water service(individual responses)
- Ratio of total water use as industrial water use (DWRe 2018a, 2018b)

Demographic

- 2015 population (DWRe 2018a, 2018b)
- Population density (computed)
- Population change, 2010–2015 (Kem C. Garner Policy Institute 2016)
- Average age (U.S. Census Bureau 2015a)
- Ratio of second homes (vacation, recreational, or occasional) to total homes (U.S. Census Bureau 2015c)
- Median household income (U.S. Census Bureau 2015b)
- Persons per household (U.S. Census Bureau 2015b)

Climatic

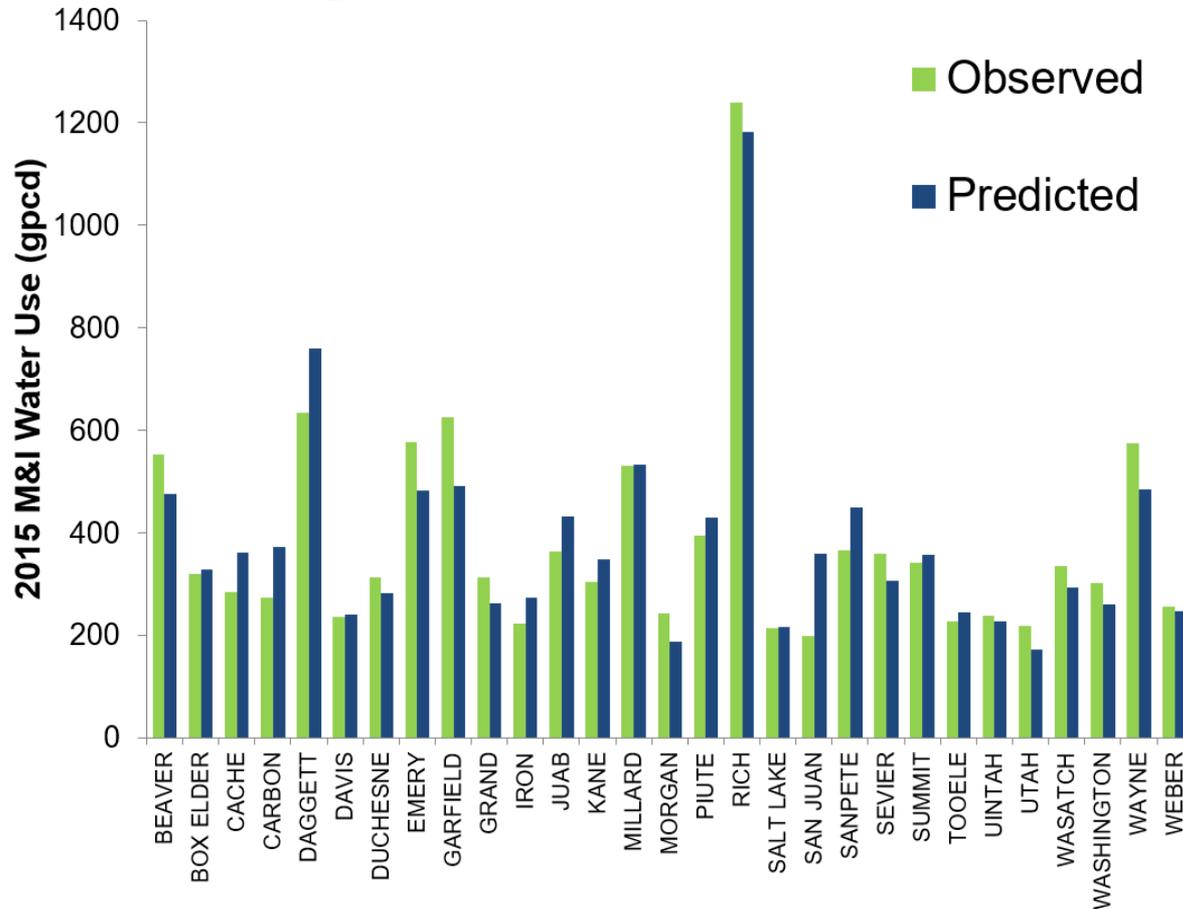
- Climate zone (Gillies and Ramsey 2009)
- Average annual precipitation, 1981–2010, raster (PRISM 2018a)
- Average annual evapotranspiration, 1980–2017, raster (DWRe 2018c; Lewis and Allen 2017)
- Average minimum vapor pressure deficit, 1981–2010, raster (PRISM 2018a)
- Average maximum annual air temperature, 1981–2010, raster (PRISM 2018a)
- 2015 total precipitation, raster (PRISM 2018b)
- 2015 total evapotranspiration, raster (DWRe 2018d; Lewis and Allen 2017)
- 2015 growing season (May–Sept.) average temperature, raster (PRISM 2018b)
- 2015 growing season (May–Sept.) total precipitation, raster (PRISM 2018b)
- 2015 growing season (May–Sept.) total evapotranspiration, raster (PRISM 2018b)

Geographic

- County (AGRC 2014)
- Area (AGRC 2014)
- Water right duty (DWRi 2018)
- Ratio of developed area as green space (DWRe 2018a)
- Average elevation (USGS 2018)

**Statistical
Model**

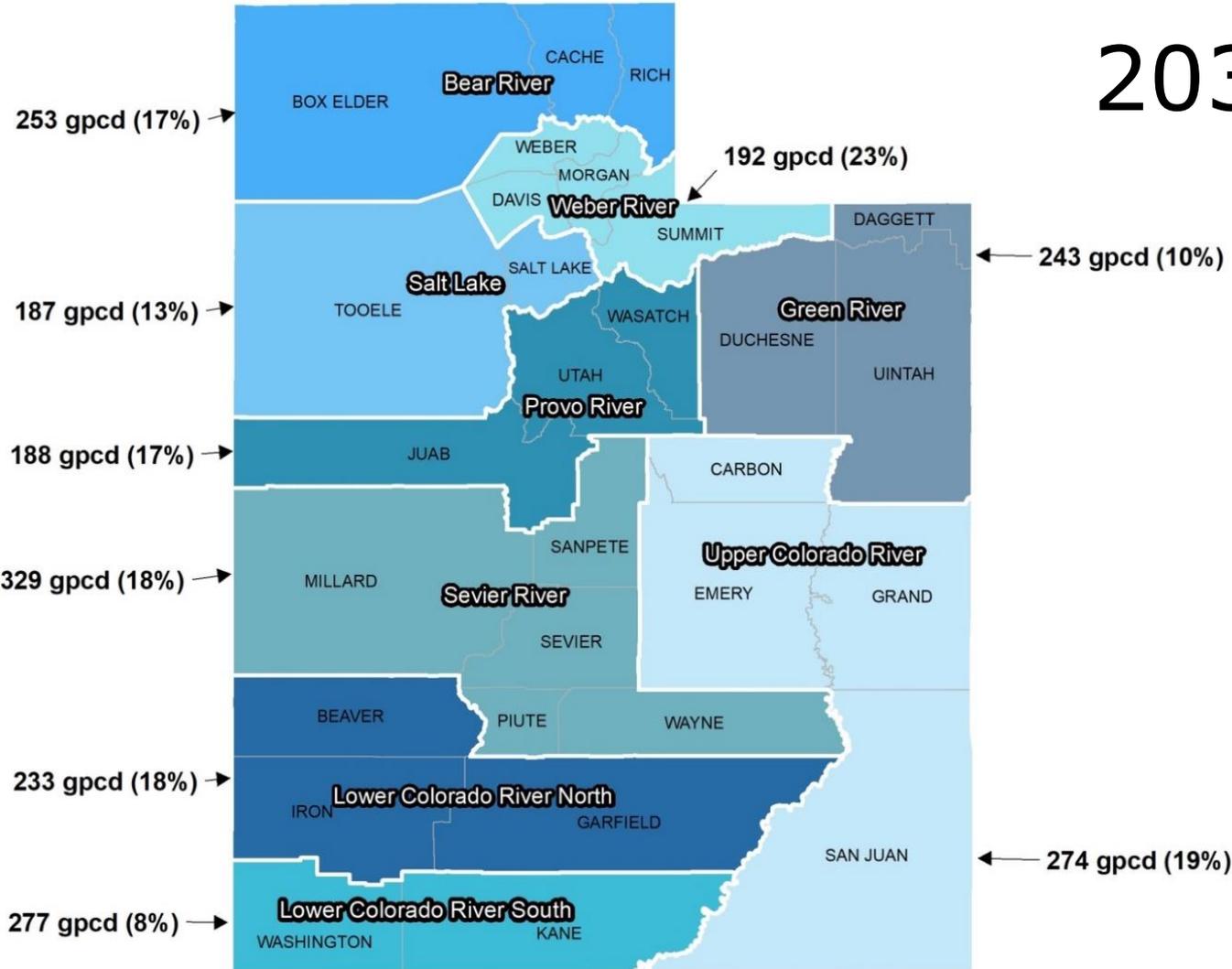
Regression Model Comparison



Elevation
Evapotranspiration
Vapor pressure deficit
Population
Population density
Second homes
Income
Industrial water use

Adj. $R^2 = 0.85$
RMSE = 82 gpcd
All $p < 0.03$

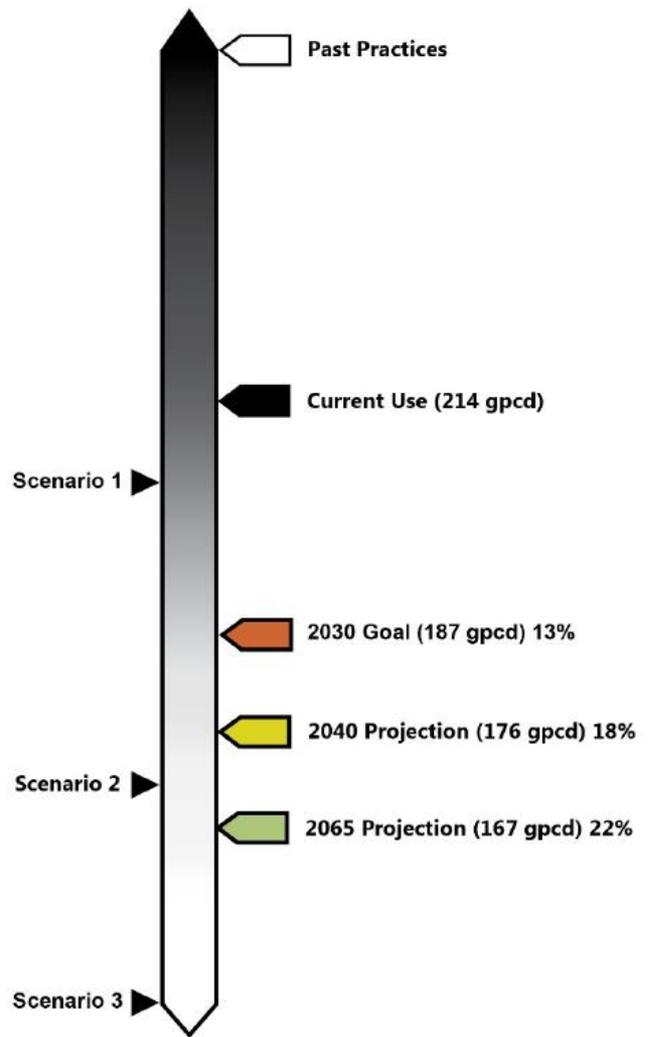
2030 Goals



2030 Goals and Future Goal Projections

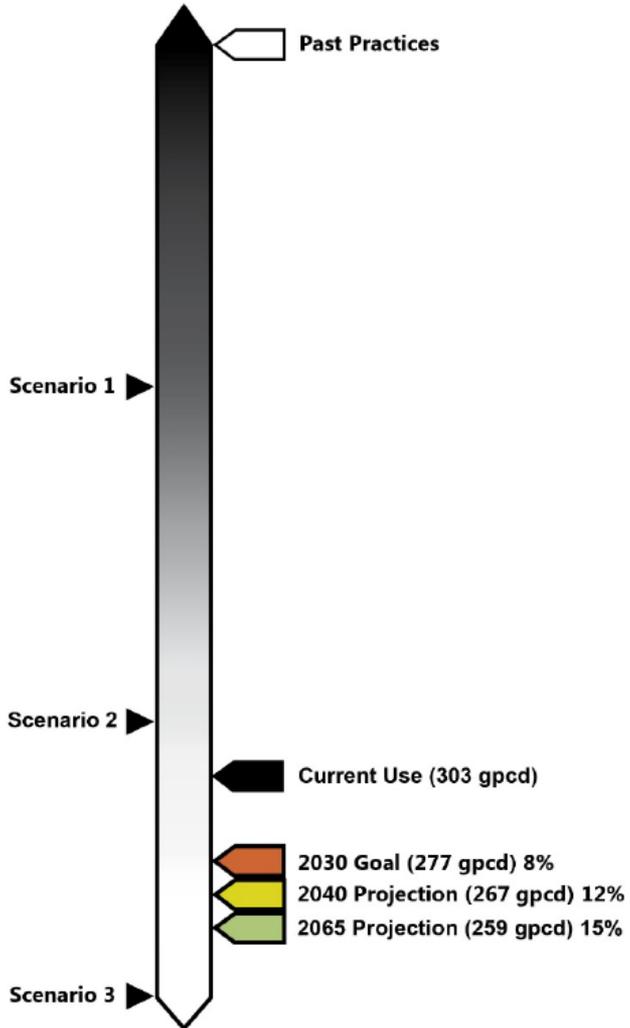
Region	2015 Baseline (gpcd)	2030 Goal		2040 Projection		2065 Projection	
		Goal (gpcd)	Reduction from 2015	Projection (gpcd)	Reduction from 2015	Projection (gpcd)	Reduction from 2015
Bear River	304	253	17%	232	24%	219	28%
Green River	270	243	10%	234	13%	232	14%
Lower Colorado River North	286	233	18%	214	25%	201	30%
Lower Colorado River South	303	277	8%	267	12%	259	15%
Provo River	226	188	17%	174	23%	170	25%
Salt Lake	214	187	13%	176	18%	167	22%
Sevier River	401	329	18%	306	24%	302	25%
Upper Colorado River	337	274	19%	257	24%	253	25%
Weber River	250	192	23%	176	30%	171	32%

Note M&I = municipal and industrial; gpcd = gallons per capita per day based on permanent population. Reported per-capita use includes all residential, commercial, institutional, and industrial uses averaged over the permanent population in each region.



Salt Lake Region

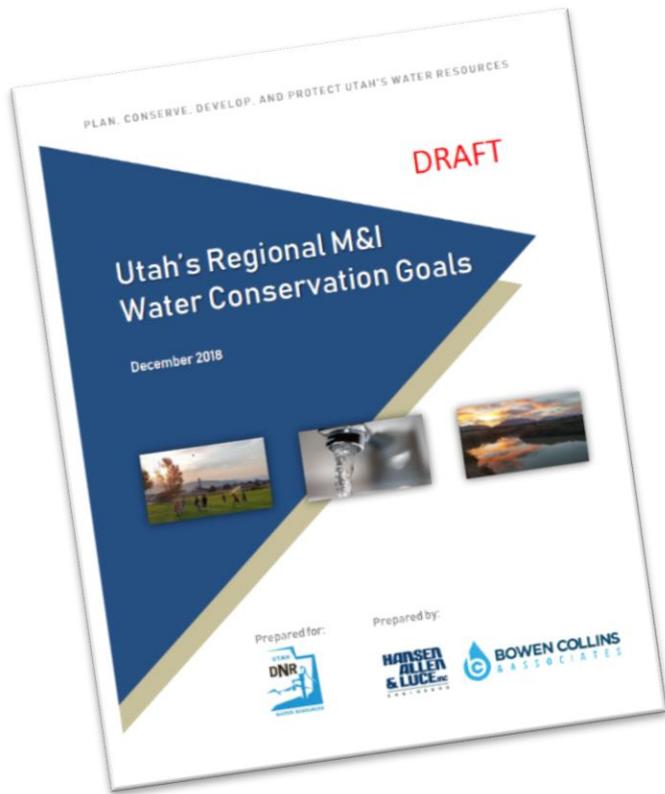




Lower Colorado South Region

Key Clarifications

- ∅ Utah should not be compared to other states that report water use differently
 - ∅ The regions should not be compared to each other
 - ∅ Current water use should not be compared to 2000 water use
- 



Report will soon be
available at
water.utah.gov

Thank You

