# Thank you for joining us today for the **Joint Regulatory Plan Review Stakeholder Meeting**

All participants have been joined in “listen only” mode.

For meeting audio, you can use your microphone and speakers (VoIP) or call in using your telephone at **877-309-2074.**
Webinar ID: **255-342-531**

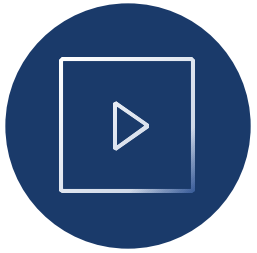
If you are having technical difficulty, please send a message to staff in the chat or email *HgGoToMeetings@subsidence.org*

# Before we Begin

This webinar is scheduled for two hours. We have left time for questions.

All participants will be muted during the presentation.

Questions can be submitted via the Go To Webinar "Questions" screen at any time.



This webinar is being recorded.

We will post slides on our website after the meeting today.

HARRIS-GALVESTON SUBSIDENCE DISTRICT

FORT BEND SUBSIDENCE DISTRICT

# 2023 Joint Regulatory Plan Review

## Stakeholder Meeting 4

08 June 2021

# Key Stakeholder Engagement Opportunities

Meeting attendance and project awareness

Providing data for technical analyses

Providing feedback on draft material

Participate in targeted outreach efforts

1

## Develop Population and Demand Projections

Develop projections of population and water demand over a ten-county area through the year 2100.

2

## Conduct Alternative Water Supply Assessment

Review alternative water supplies for the capability of reducing future groundwater demand.

3

## Develop the Gulf Coast Land Subsidence and Groundwater Flow Model

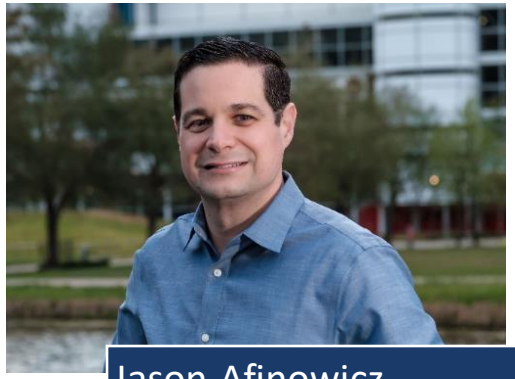
Development of the GULF-2023 model for simulating regional groundwater flow and subsidence in the Gulf Coast Aquifer.

4

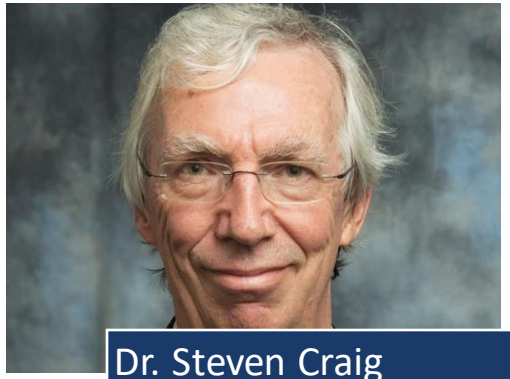
## Evaluate Regulatory Scenarios

Evaluate the performance of the HGSD and FBSD regulatory plans and consider refinements to the regulatory plan framework to accommodate future growth, alternative water supplies, and the most recent aquifer science.

# Today's Speakers



Jason Afinowicz
- Freese and Nichols



Dr. Steven Craig
- University of Houston

Sunil Kommineni
- KIT

Justin Bartlett
- KIT

Wade Oliver
- INTERA

# Project Elements

Projected Water Needs

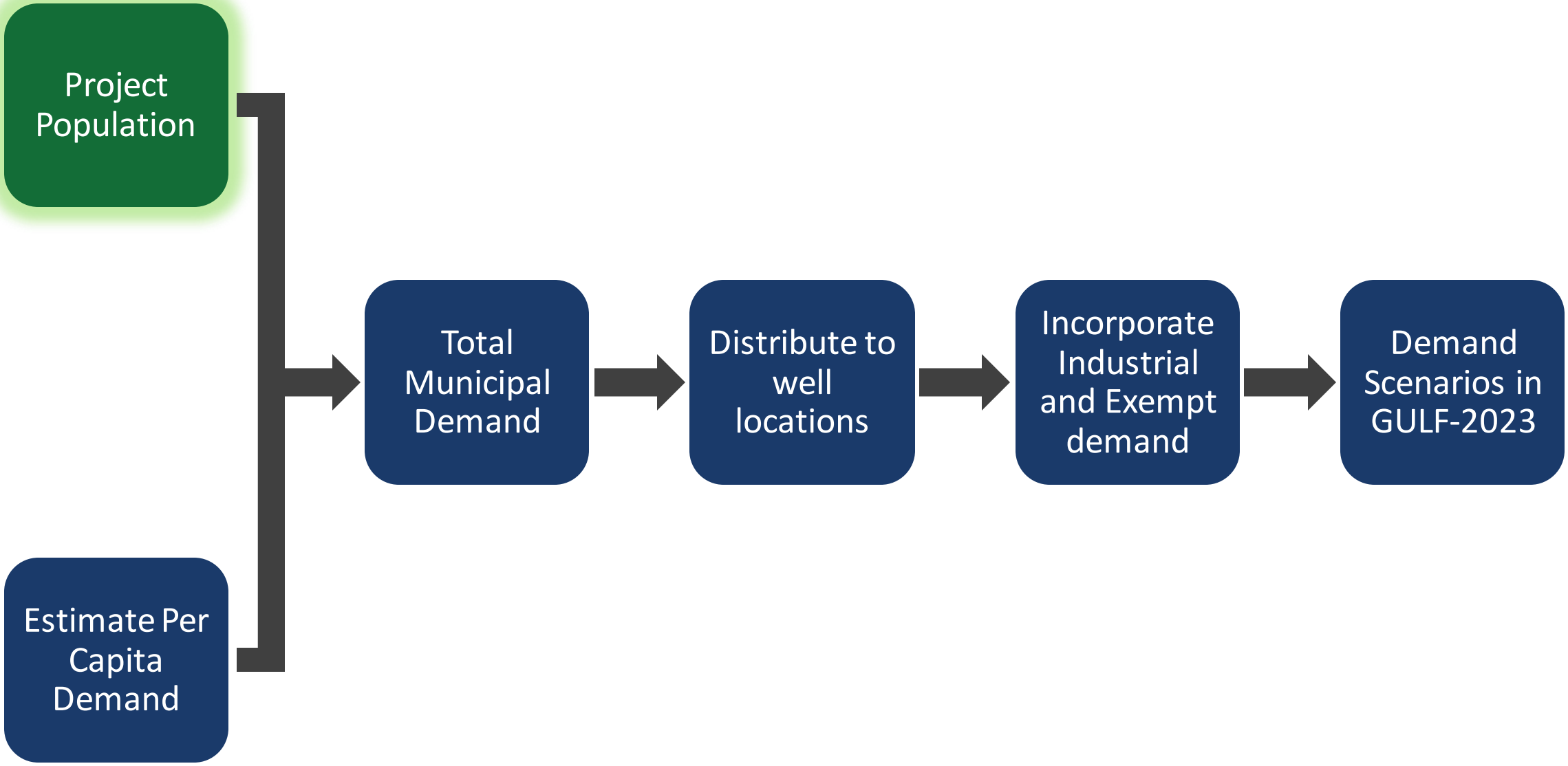
Alternative Water Supply Availability

# Overview

Enhancements to 2013 Regulatory Plan Update methodology

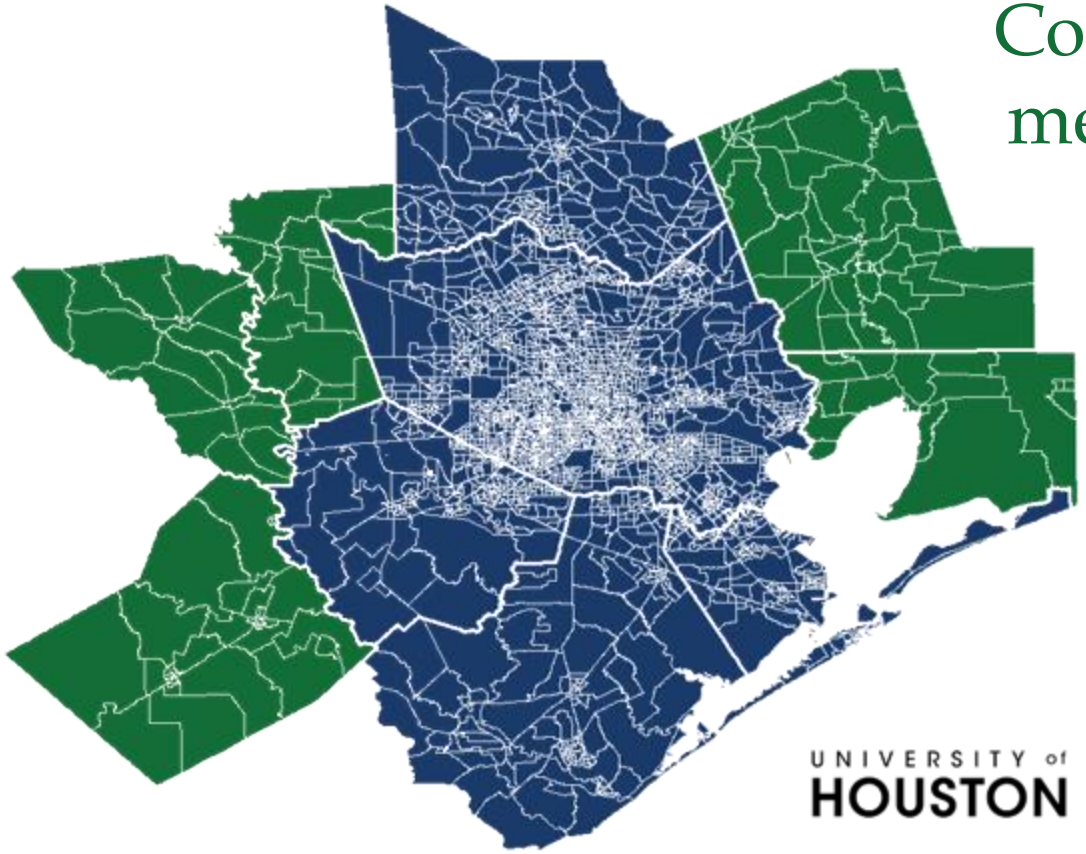
- Ten counties
- Evaluate single- and multi-family growth
- Refine industrial projections
- Stakeholder data
- Various demand futures
- Projections to 2100

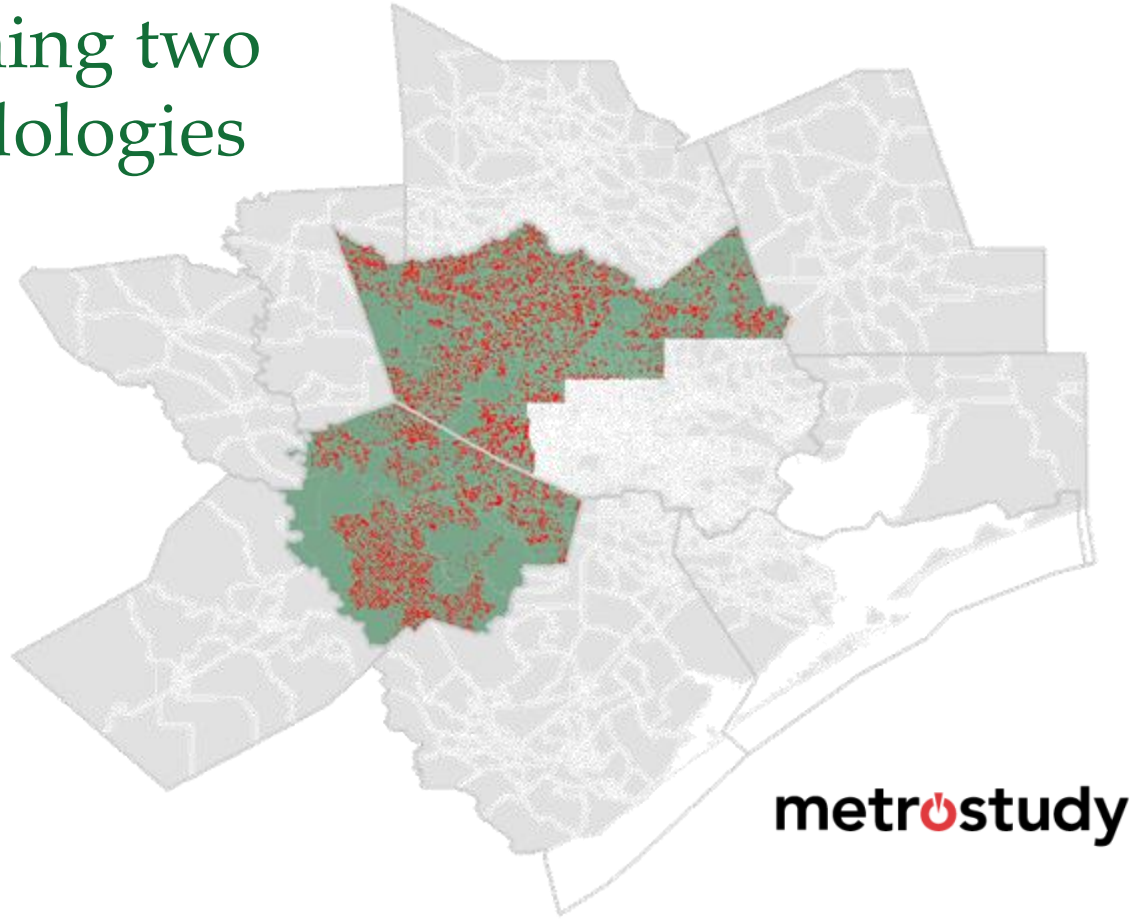
# Overview


Project Population
Estimate Per Capita Demand
Total Municipal Demand
Distribute to well locations
Incorporate Industrial and Exempt demand
Demand Scenarios in GULF-2023

# Projected Population

Combining two methodologies

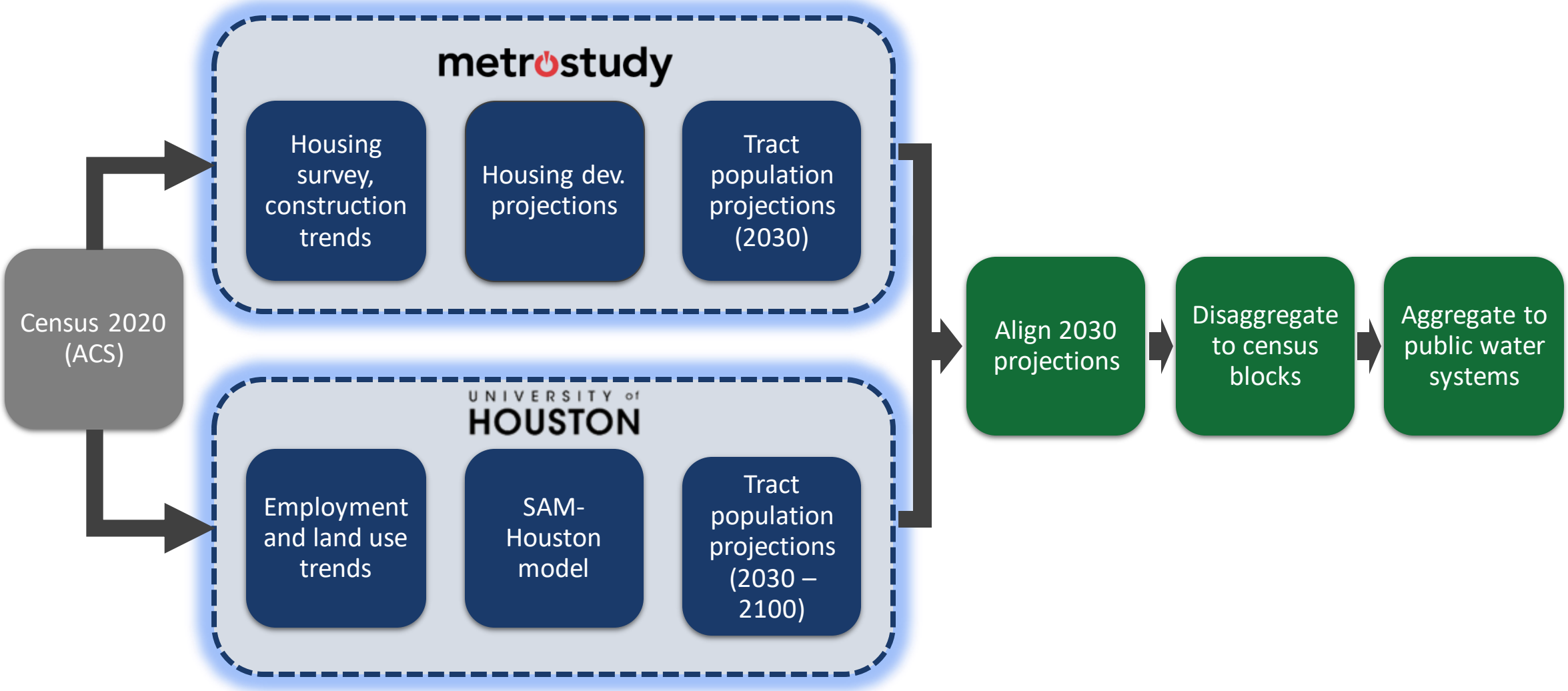



Small Area Model Houston (SAM-Houston)
Long-range, wide-area projections

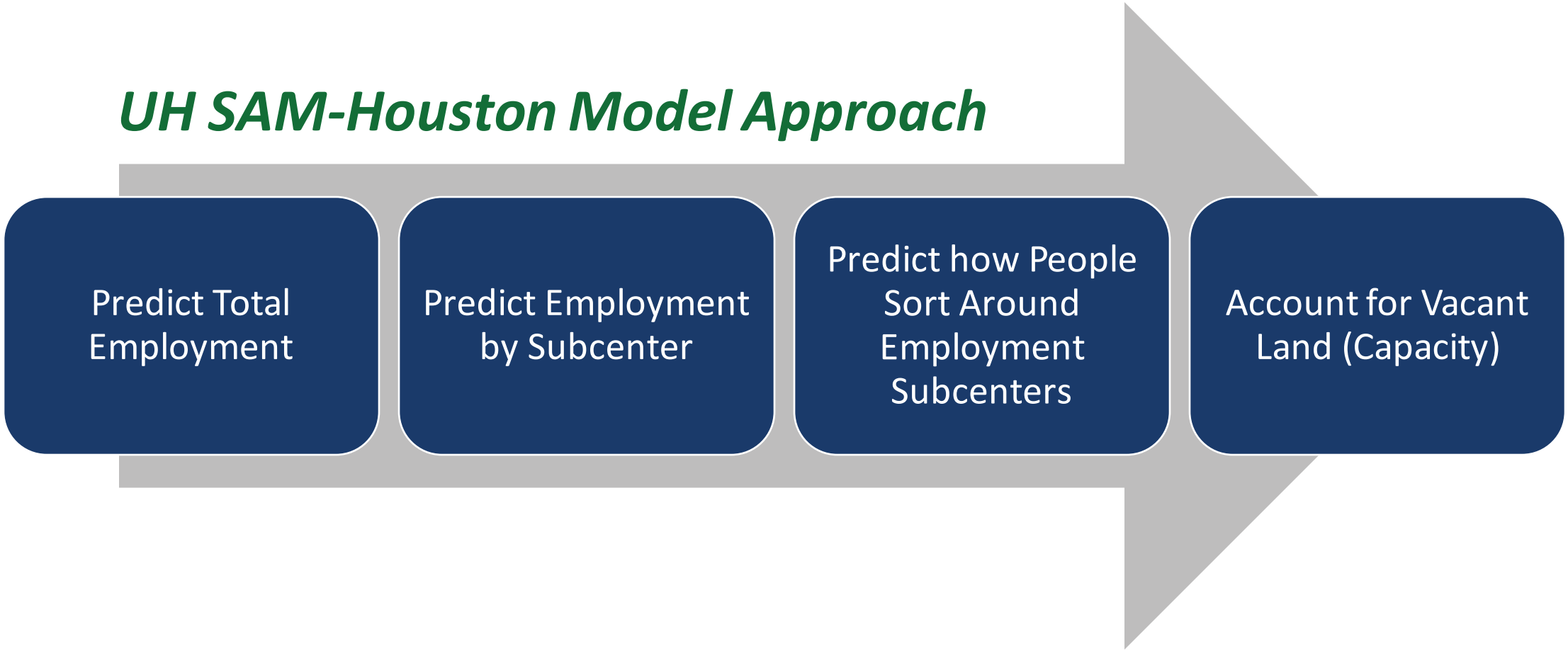
Projected Development Methodology
Short-range, detailed projections

# Projected Population



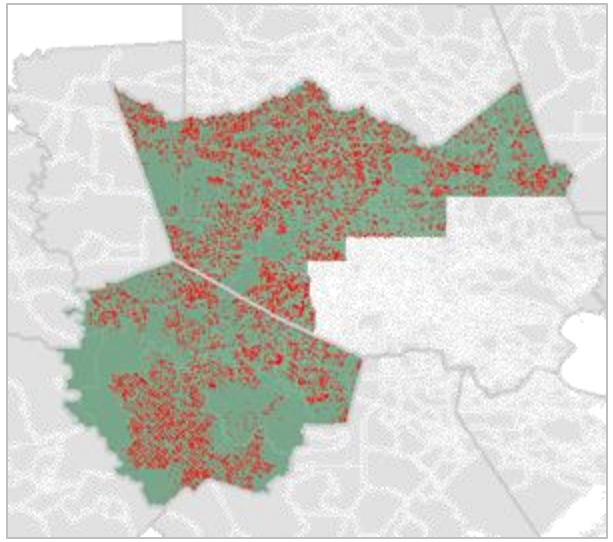
# Projected Population

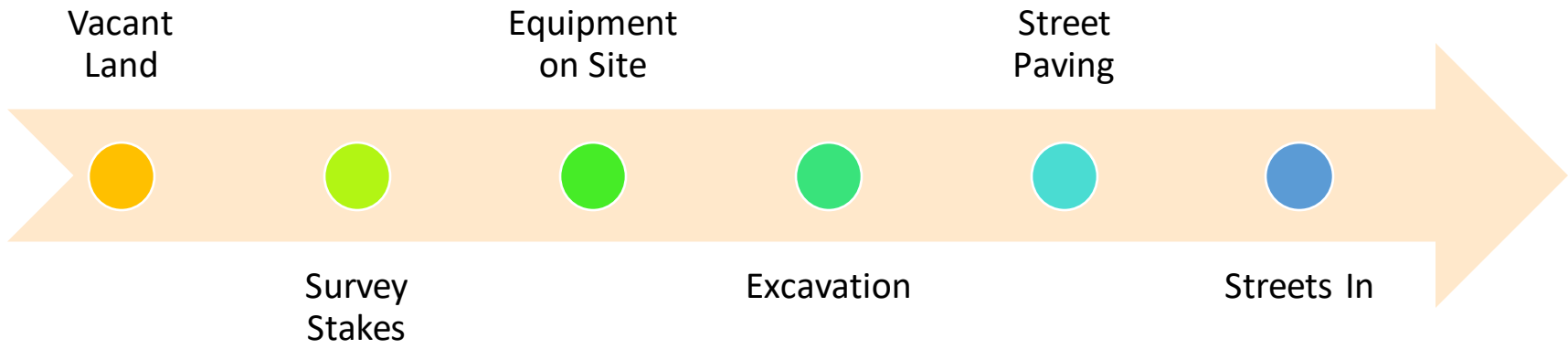
## *UH SAM-Houston Model Approach*



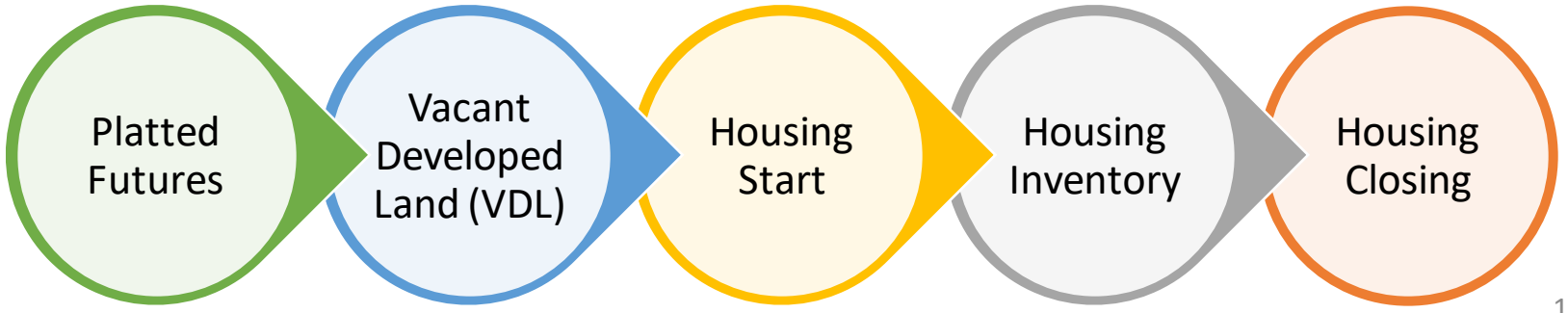
# Projected Population

- Metrostudy Projected Development Methodology
  - Land/lot development

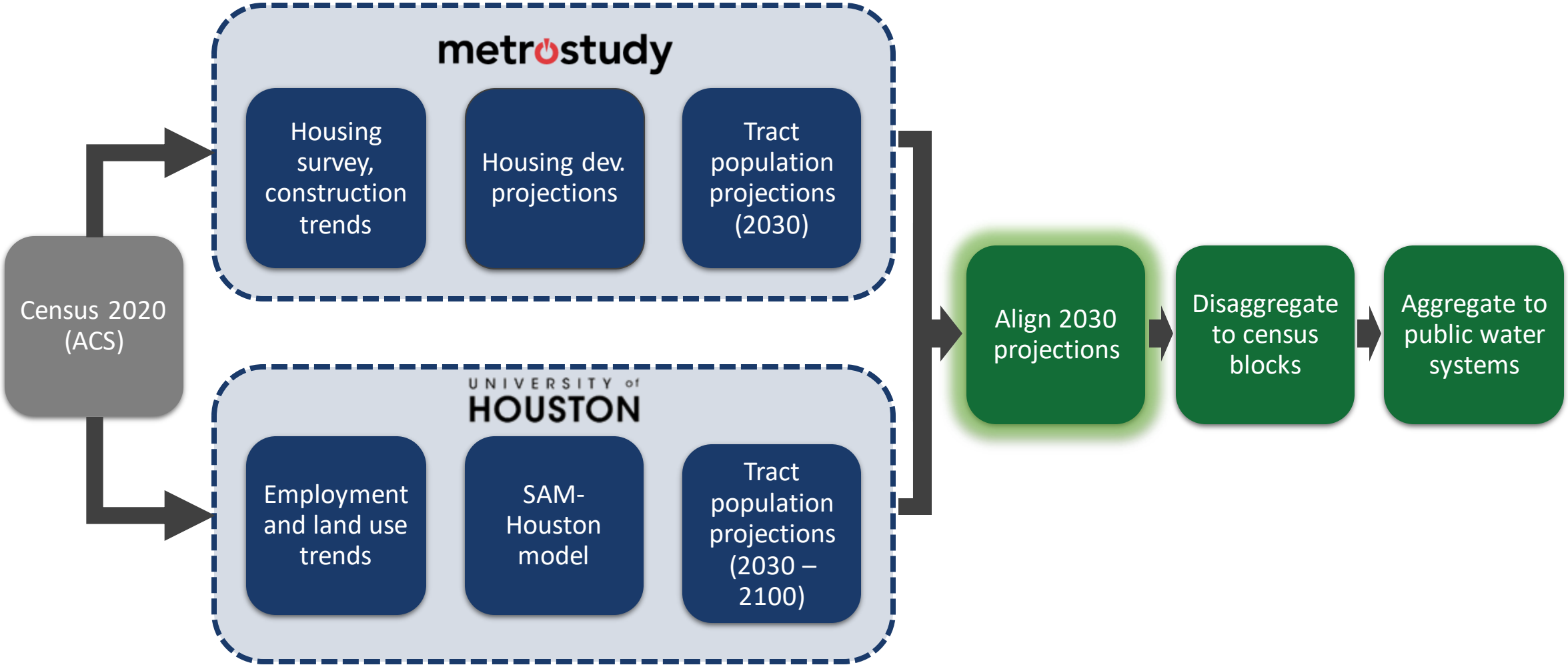




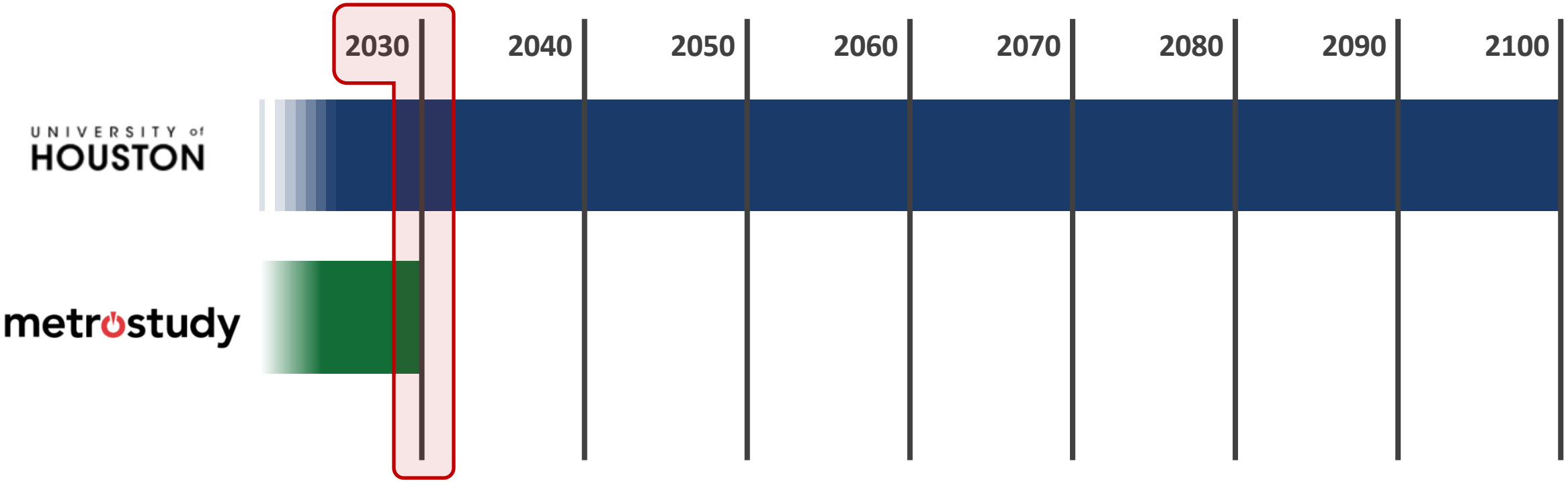

  - New home development



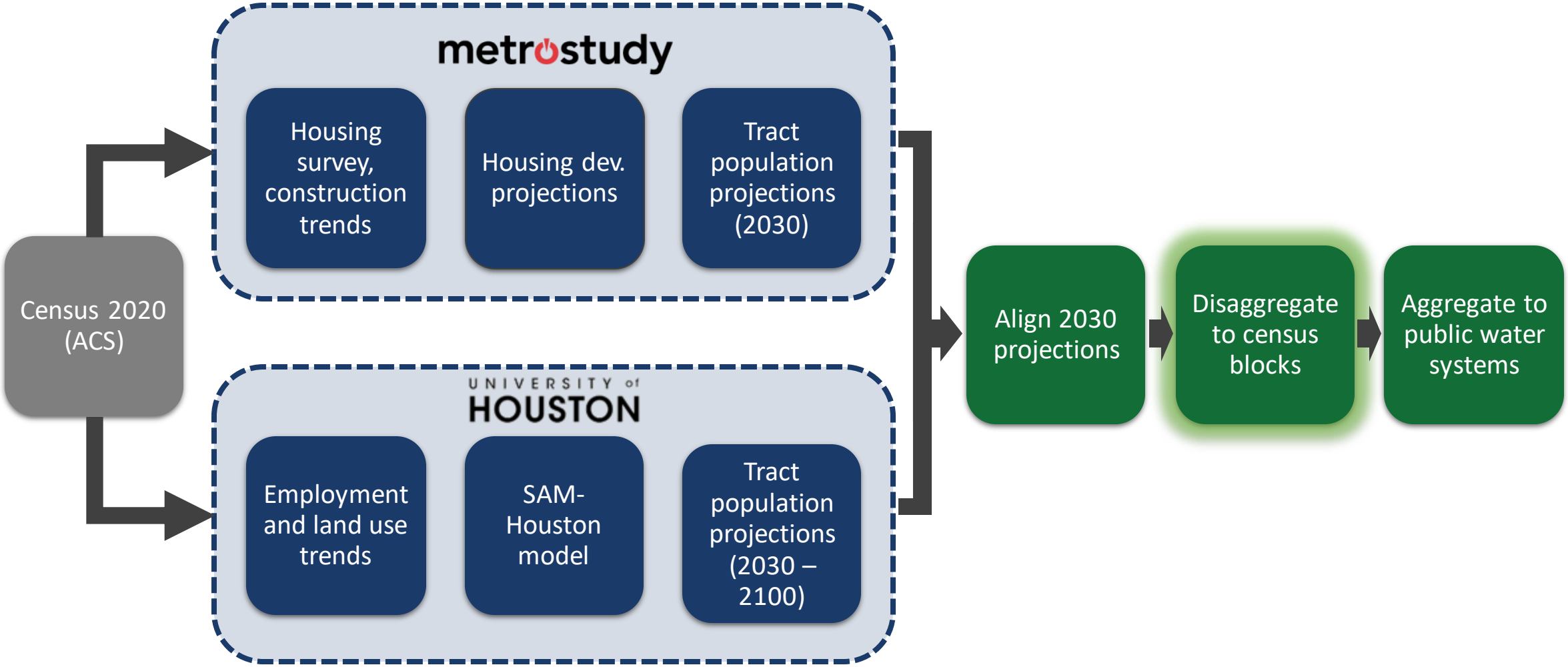
# Projected Population



# Projected Population: Align 2030 Projections



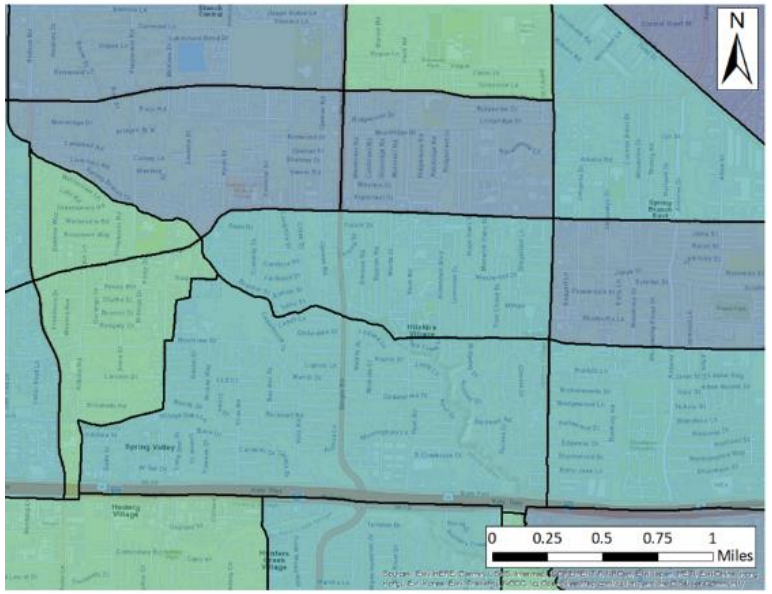
# Projected Population

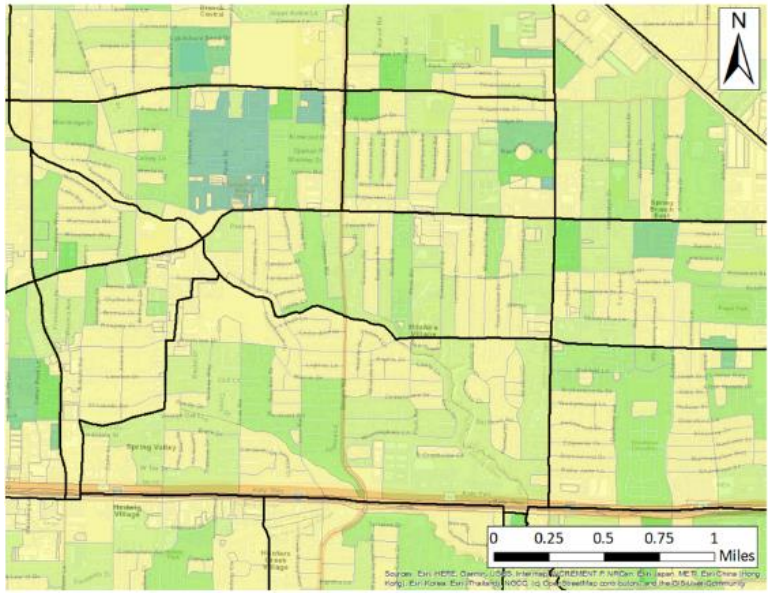


# Projected Population

## Disaggregate Tract Projections

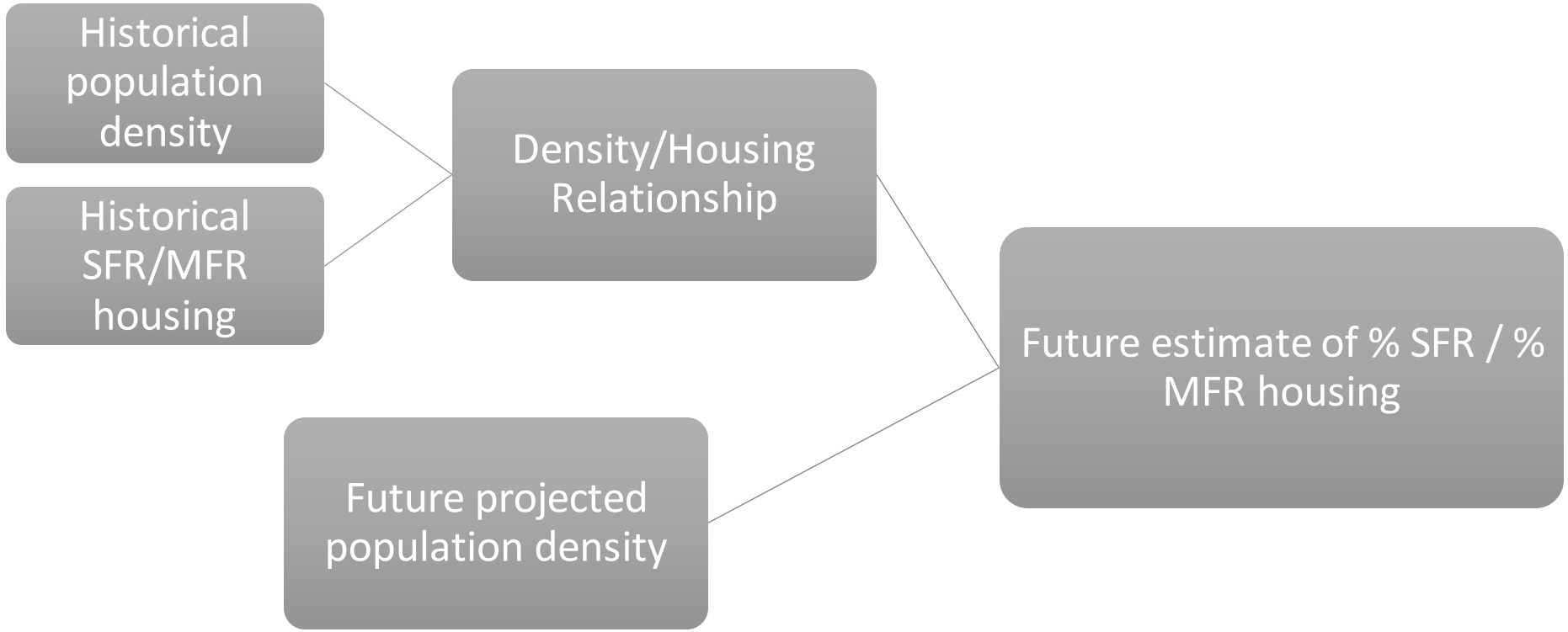
- Initial distribution
  - 2020 Census data
  - Metrostudy 2030 projections where available
- Constrain growth to developable land based on land use and floodplains.
- Distribute <u>new</u> population each decade from existing population centers



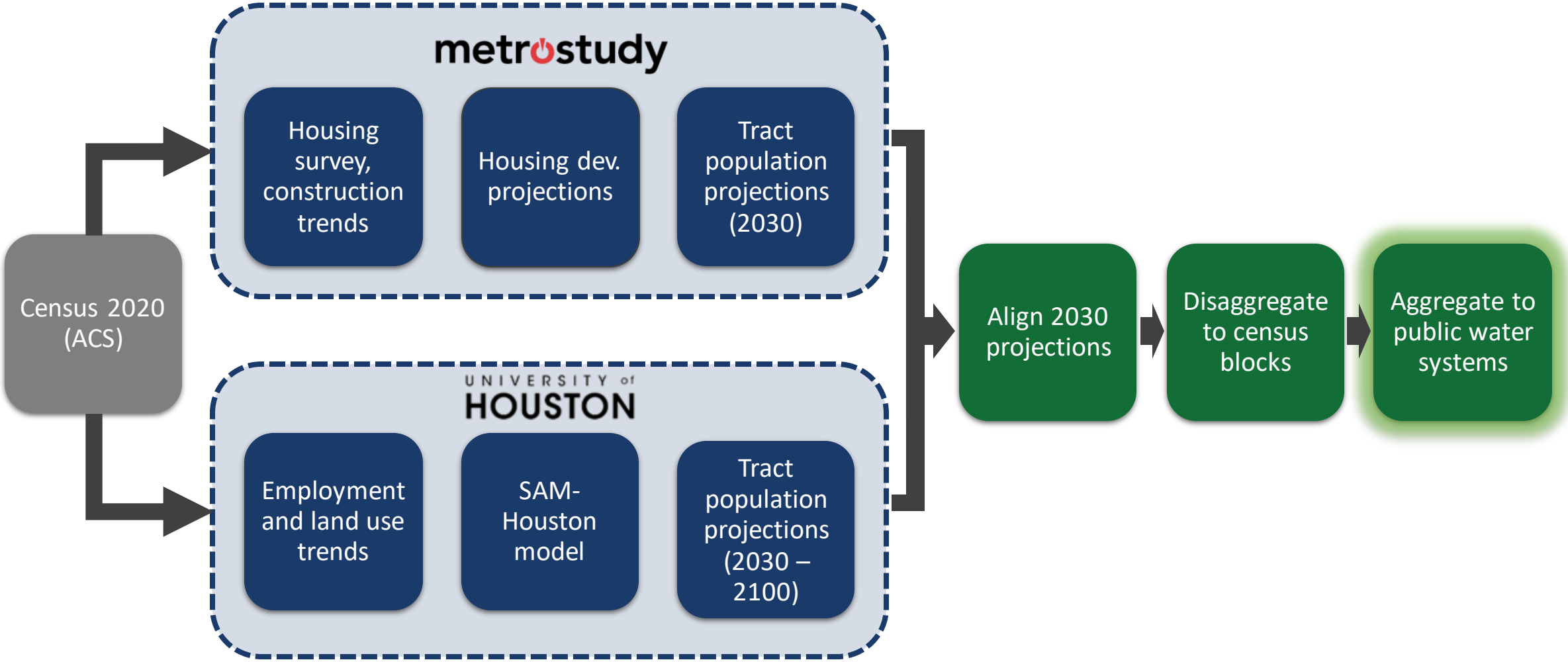



# Projected Population

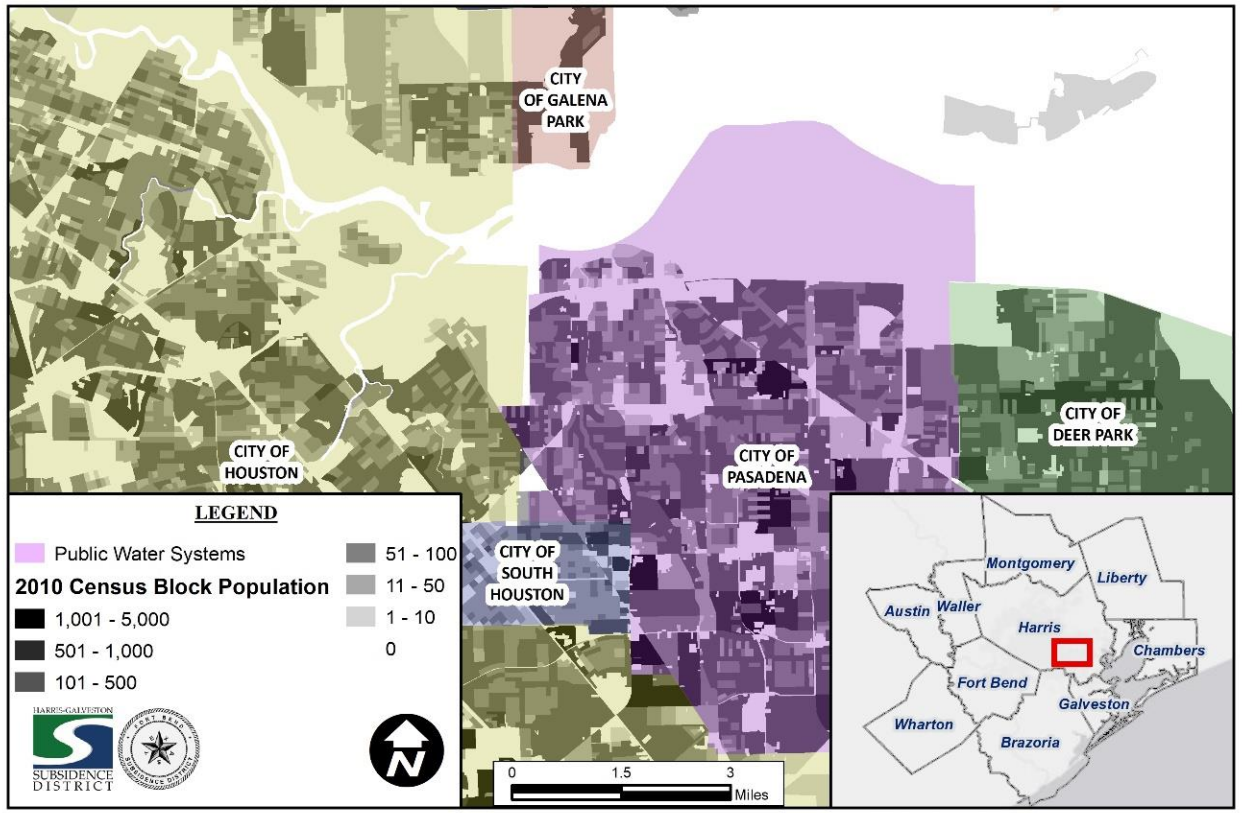
Partition single- and multi-family growth



# Projected Population



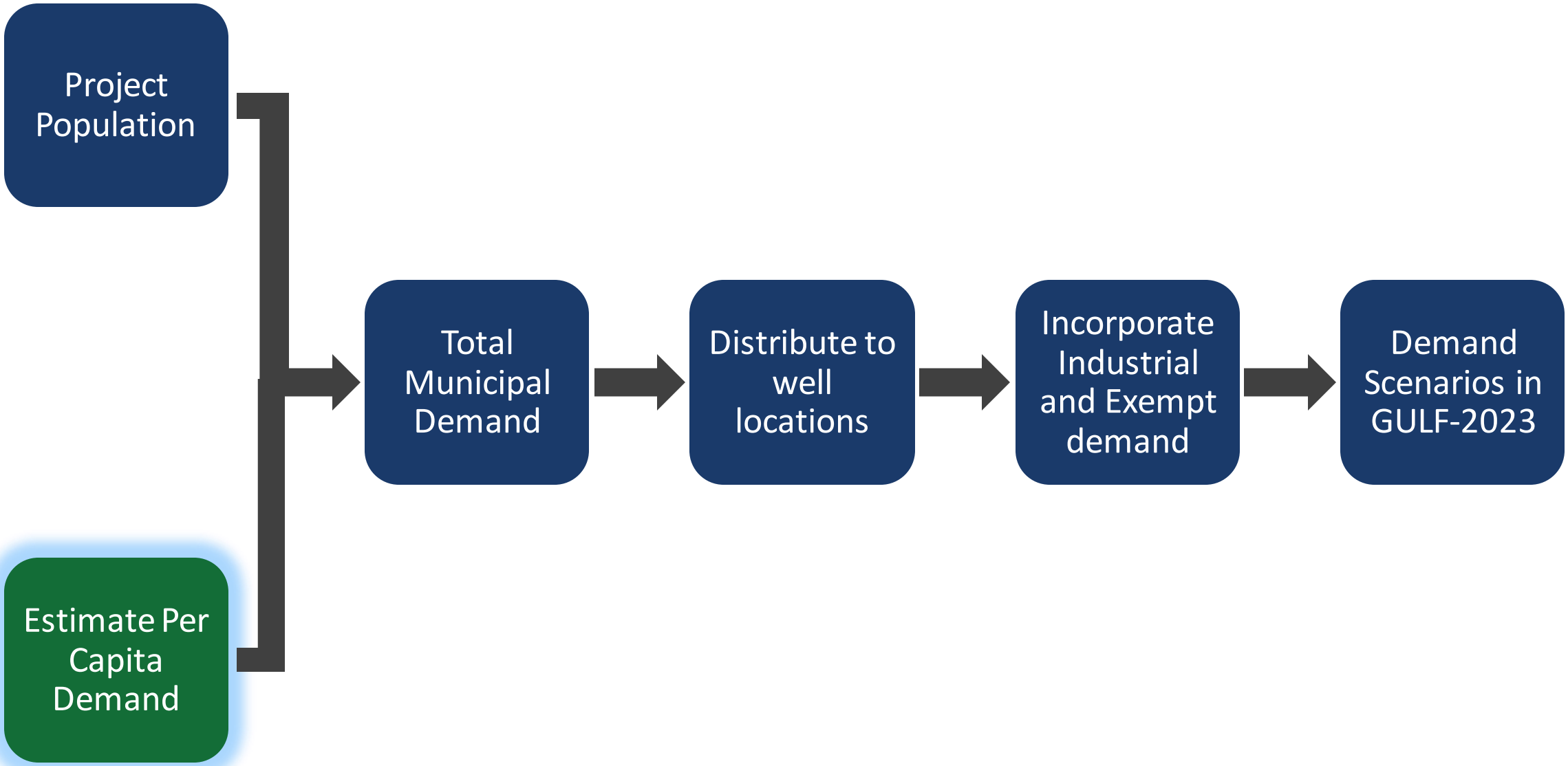
# PROJECTED POPULATION




Final Step:

Aggregate fine-scale projections to estimate population for **each PWS** in **each decade**.

# Projected Demands



# Projected Demands: Municipal

1. Determine historical annual GPCD (by PWS).

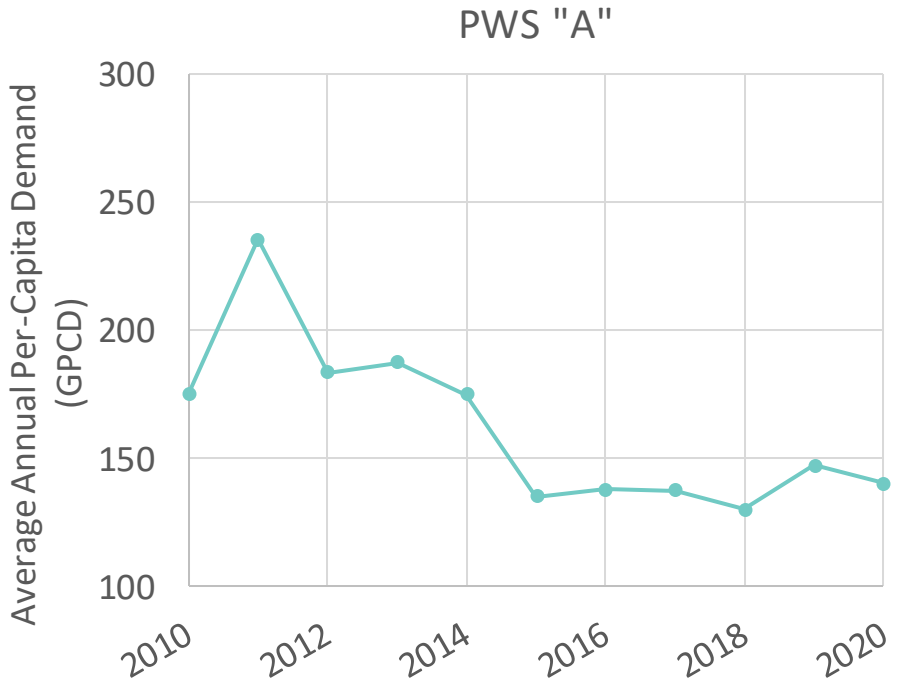
Each year, each PWS

### Water Use

- Stakeholder data
- TWDB
- Drinking Water Watch

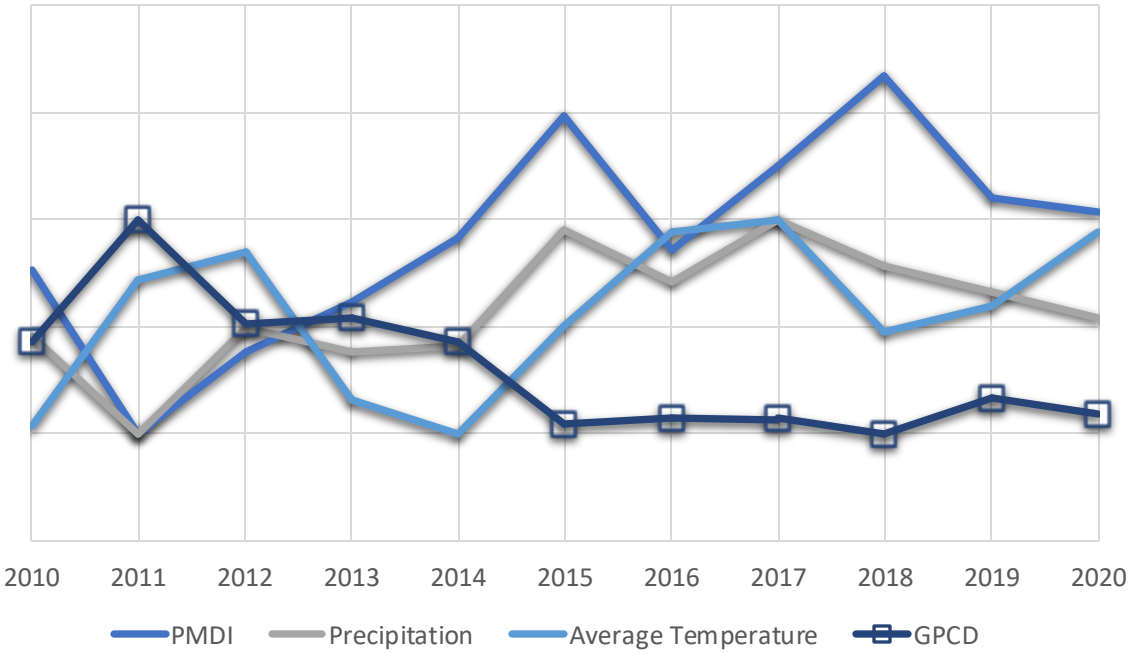
### Population

- Stakeholder data
- American Community Survey



# Projected Demands: Municipal

2. Develop multilinear regression (MLR) model relating climate and GPCD.




More rain: lower demands

Higher temps: higher demands

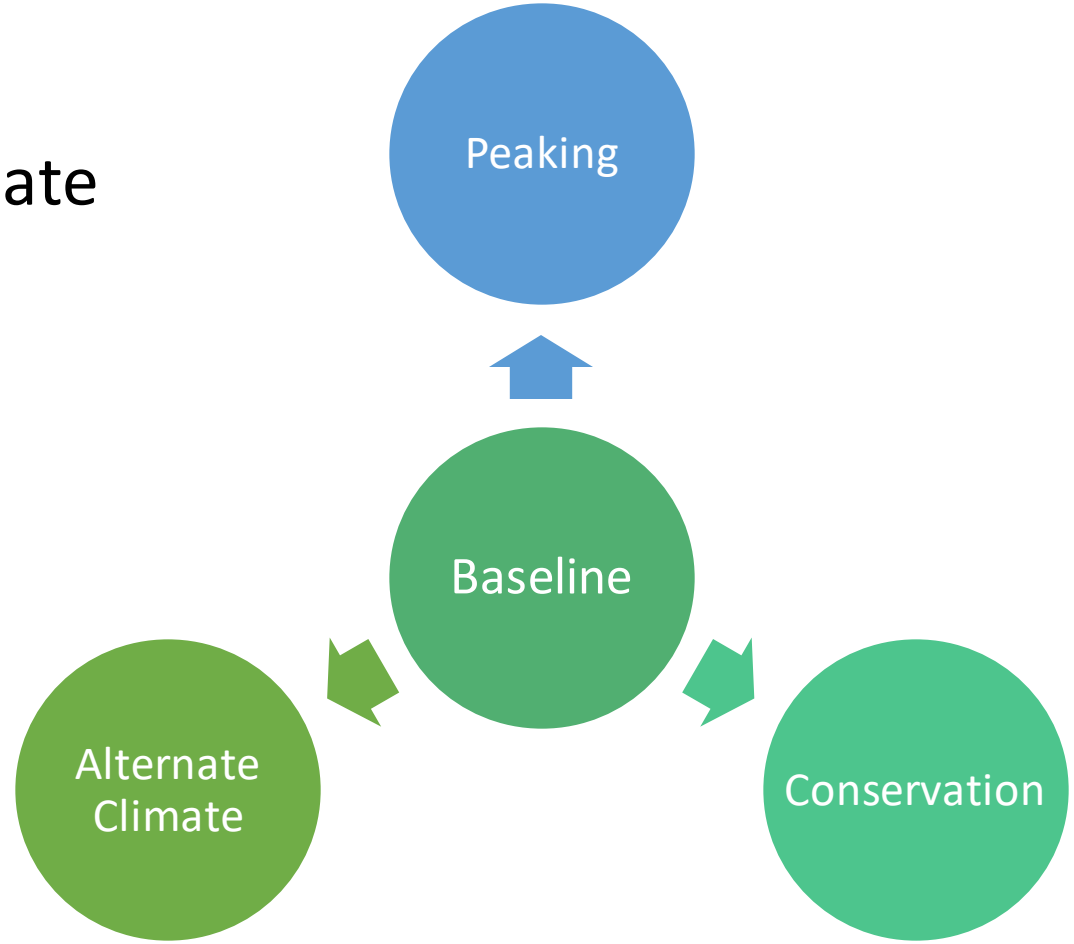
# Projected Demands: Municipal

3. Isolate “typical” GPCD based on average climate conditions.

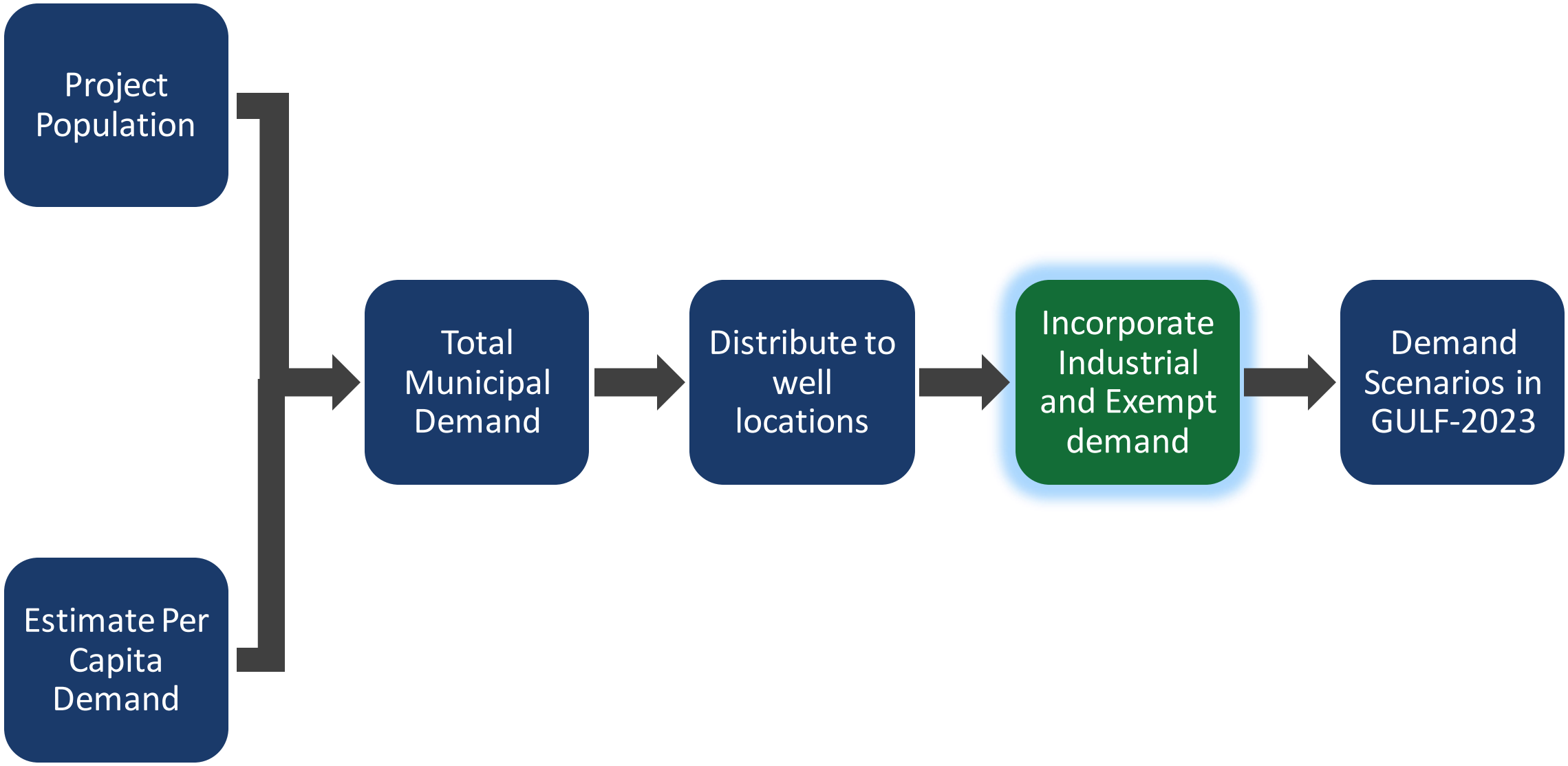
→ BASELINE scenario

# Projected Demands: Municipal

4. Vary GPCD using annually cycling climate conditions to generate peak years
   → PEAKING scenario
5. Vary GPCD based on conservation and/or climate conditions
   → CONSERVATION scenarios
   → CLIMATE scenarios
6. Multiply GPCD by annual population projections
   → Municipal Demand Projection



# Projected Demands



# Projected Demands: Non-Municipal

**Industrial**
(non-exempt)

**Agricultural**
(exempt and non-exempt)

**Domestic**
(exempt)

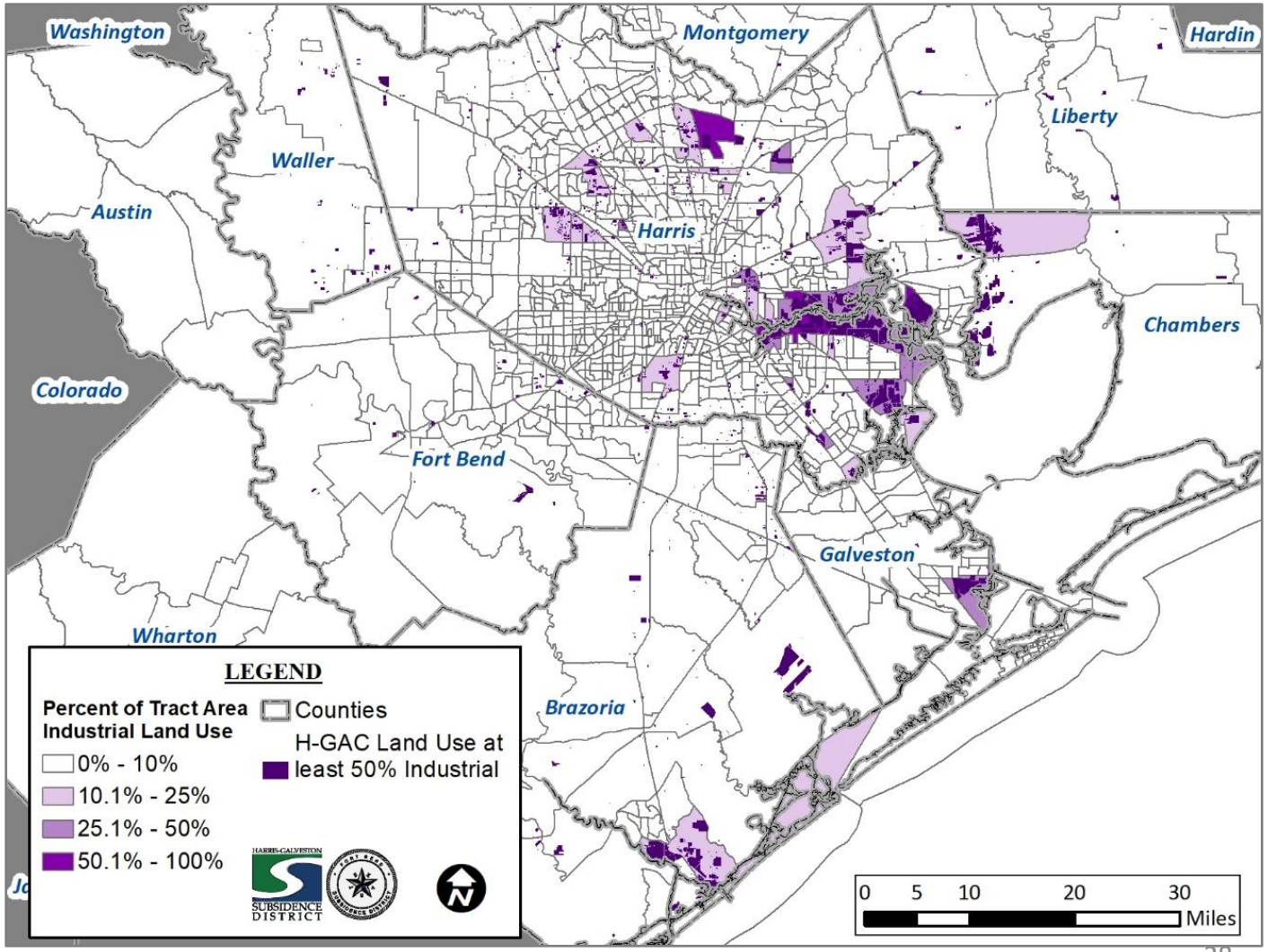
**Mining**
(exempt)

# Projected Demands: Industrial

Employment Growth Projections in Industrial Areas

Historical Industrial Water Use

Projected Industrial Needs

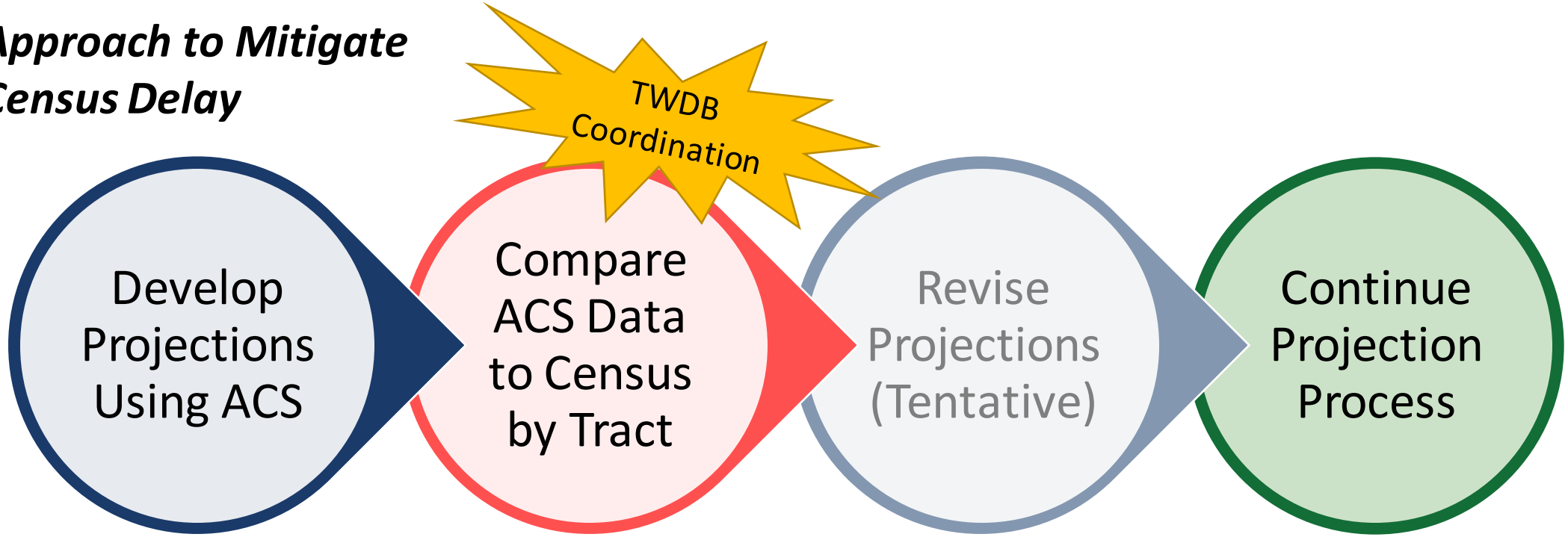


# 2020 Census Schedule

- Setbacks due to pandemic
- Revised schedule:
  - Mid- to late- August
  - September 30 for some products
- Result is a 4+ month delay for the initiation of projections

# 2020 Census Schedule

***Approach to Mitigate Census Delay***




Two-Month Delay
(September to November)

Possible Two-Month Delay
(November to January)

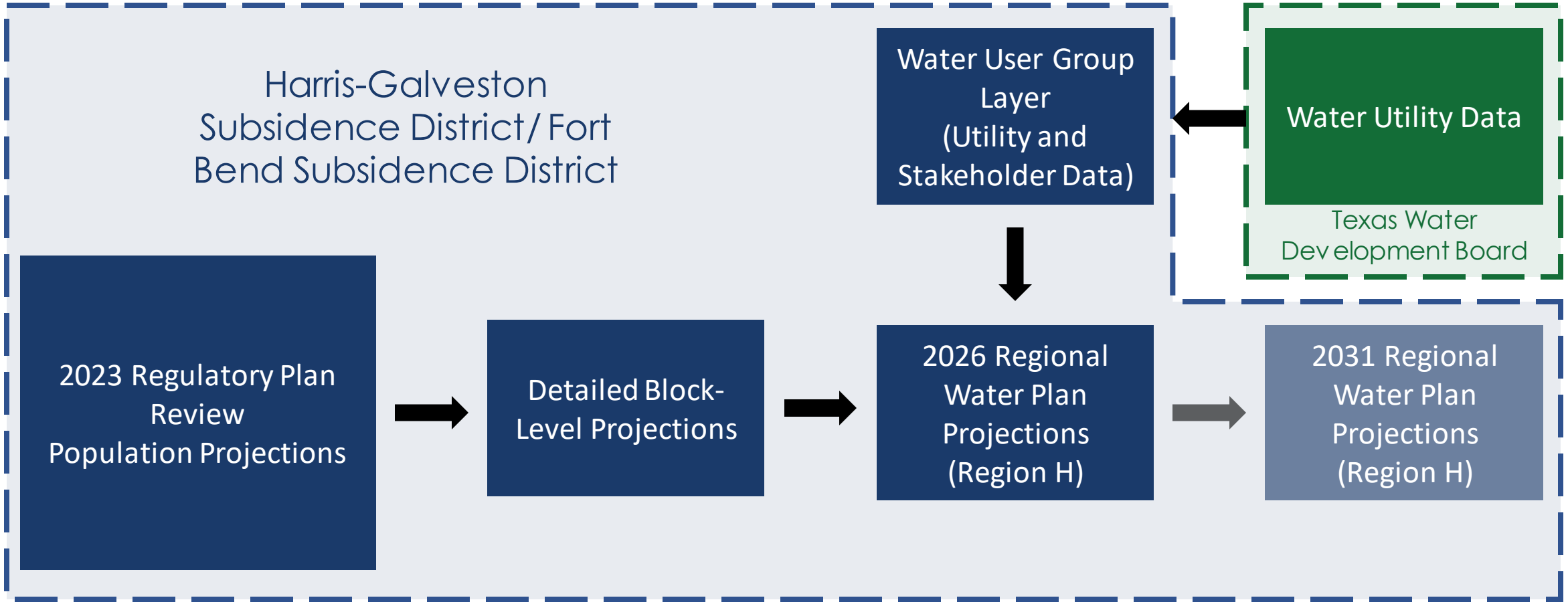
# Stakeholder Process

Stakeholders

Joint Regulatory Plan Review

TWDB, Region H

# Stakeholder Process

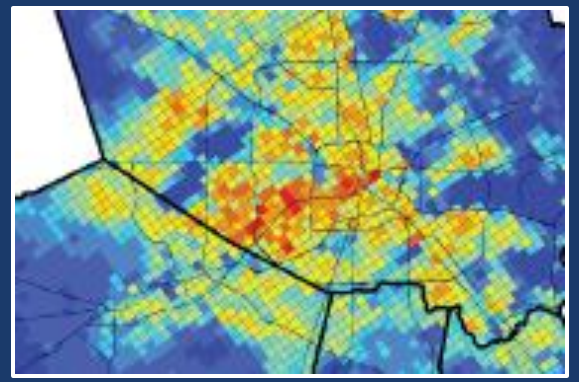


# Stakeholder Process

## Data Collection (2021 Q3)

- Water use:
  - Connections
  - Monthly usage
  - Total, single-family, multi-family
- Service area
  - Anticipated growth
- Conservation:
  - Savings
  - Measures

## Population Projection Review (2022 Q2)



- Online GIS tool for review
- Opportunity for feedback and directed meetings
- In parallel with demand projections

# Project Elements

Projected Water Needs

Alternative Water Supply Availability

# AWSA Study Objectives

- Confirm adequate alternate water supplies are available to meet the regulatory intent
- Compile and characterize alternative water supplies and their availability for use by systems in the regulatory areas

# AWSA Study Overview

## AWS Options

**Identified 20+ Options**

NW - New Water
SS – Storage Solution
RS - Reclaimed Supply
DM - Demand Management

| Surface Water Development | Reclaimed Water | Seawater Desalination | Brackish Groundwater Desalination | Aquifer Storage and Recovery | Stormwater Capture and Reuse | Water Demand Management |
|---|---|---|---|---|---|---|
| SS / NW | RS | NW | NW | SS | NW | DM |
| New Reservoirs | Purple Pipe Network | Onshore Facility Desalination | Brackish Groundwater Wells and Treatment | ASR w/ Surface Water | Rainwater Harvesting | Baseline Conservation |
| Off Channel Reservoirs | Direct Potable Reuse | Offshore Facility Desalination | | ASR w/ Stormwater | Detention Basins | Basic Conservation |
| Inter-Basin Transfers | Indirect Potable Reuse | | | ASR w/ Reclaimed Water | Amenity Lake Filling | Advanced Conservation |
| Appropriated but Undeveloped Water | Satellite Plants / Onsite Reuse | | | | | Water Loss Control / Advanced Metering Infrastructu |
| | Industrial Process Water | | | | | |

## Shortlisted Options

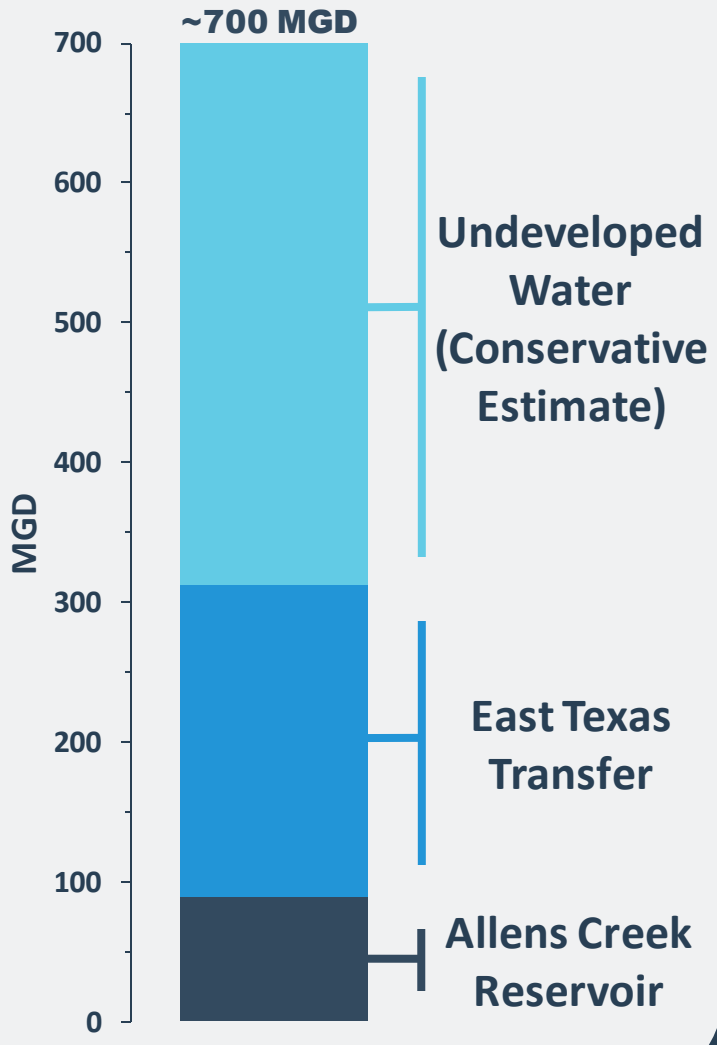

## Characterization of Shortlisted Options


## Stakeholders Outreach

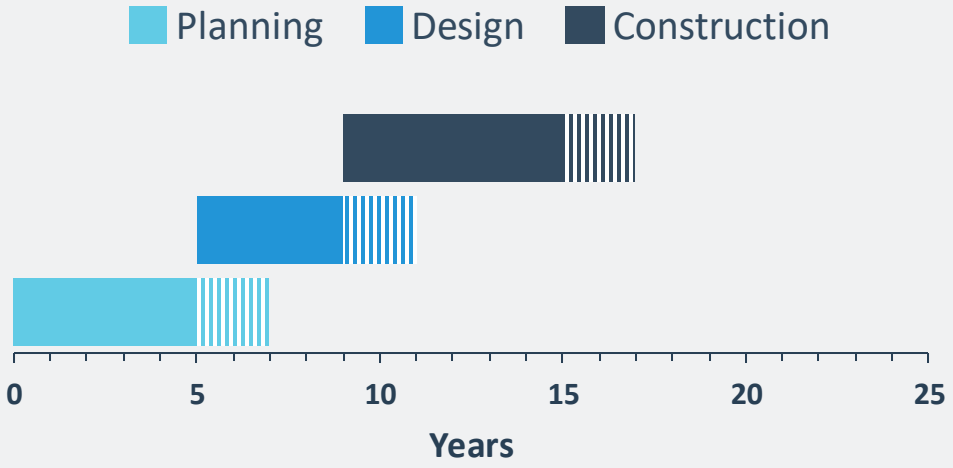
- City of Houston
- Gulf Coast WA
- North Harris CRWA
- West Harris CRWA
- North Fort Bend WA
- City of Sugar Land
- City of Richmond
- Marathon Petroleum
- Missouri City
- League City
- City of Baytown
- Texas City
- Cinco Ranch MUD 1
- San Jacinto River Authority

# Surface Water Development

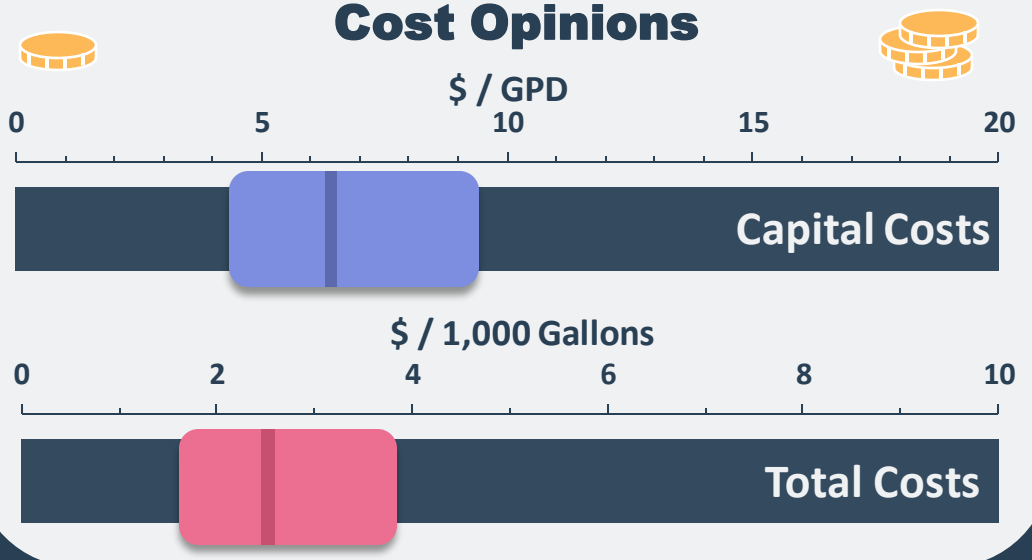
## Magnitude of Supply



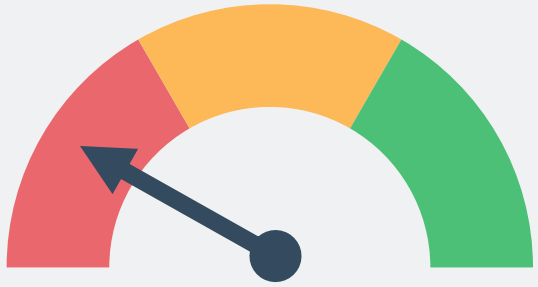

## Implementation Timeline




## Cost Opinions




## Climate Resiliency



Drought-Susceptible

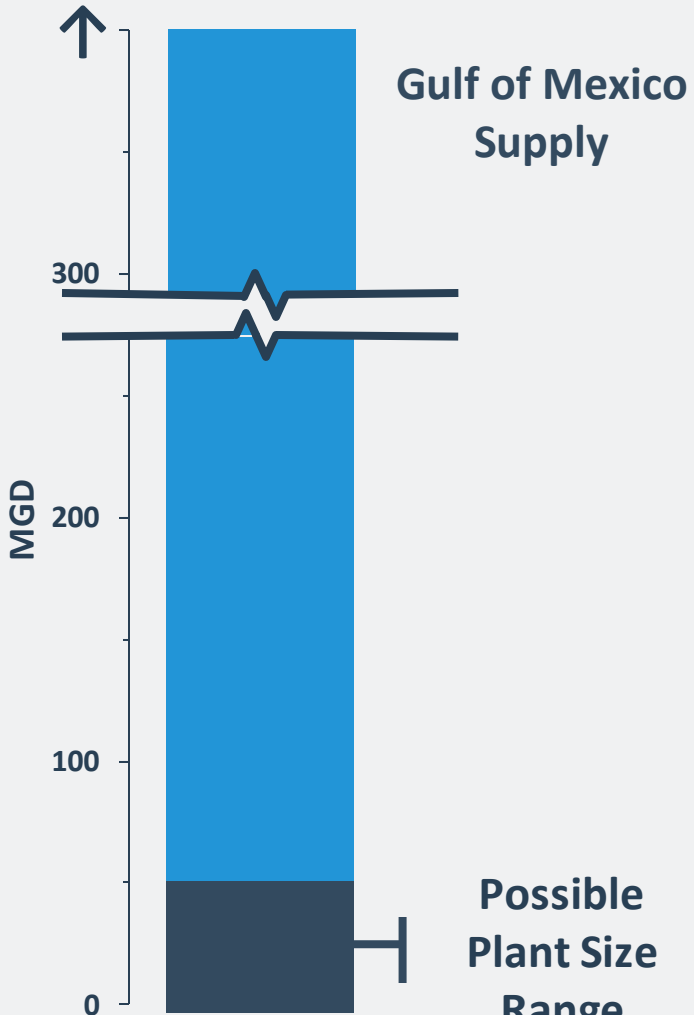
## Subsidence Impacts

No Subsidence

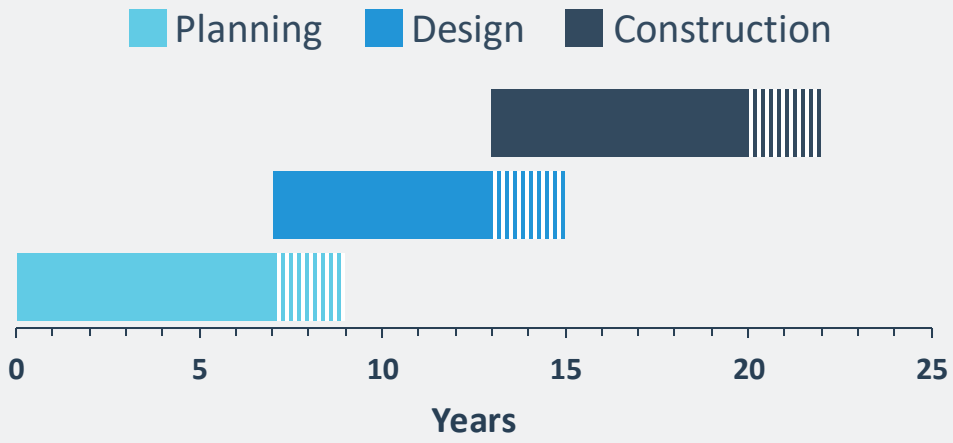
Preliminary
Subject to Revisions

# Seawater Desalination

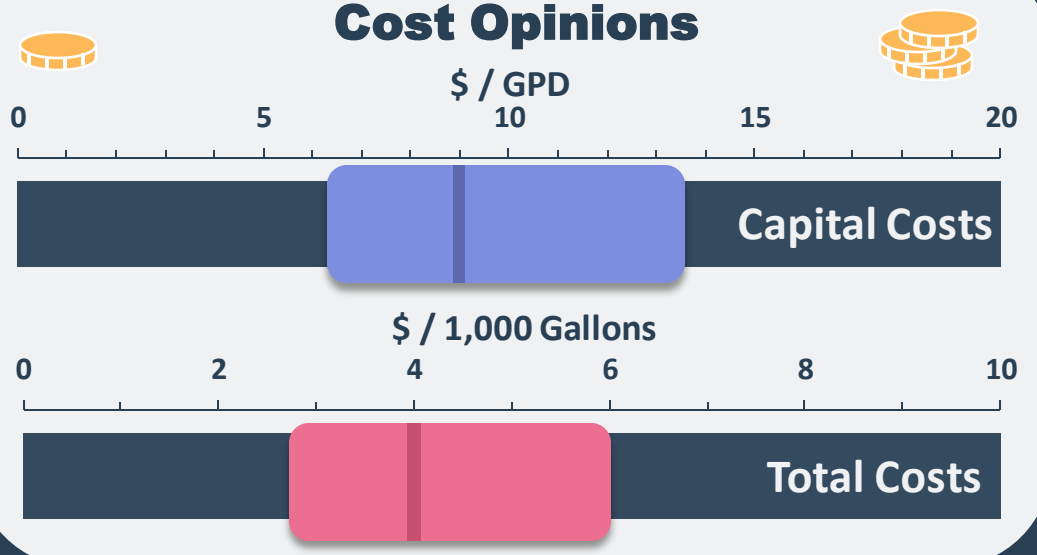
## Magnitude of Supply




## Implementation Timeline




## Cost Opinions




## Climate Resiliency

Drought-Proof

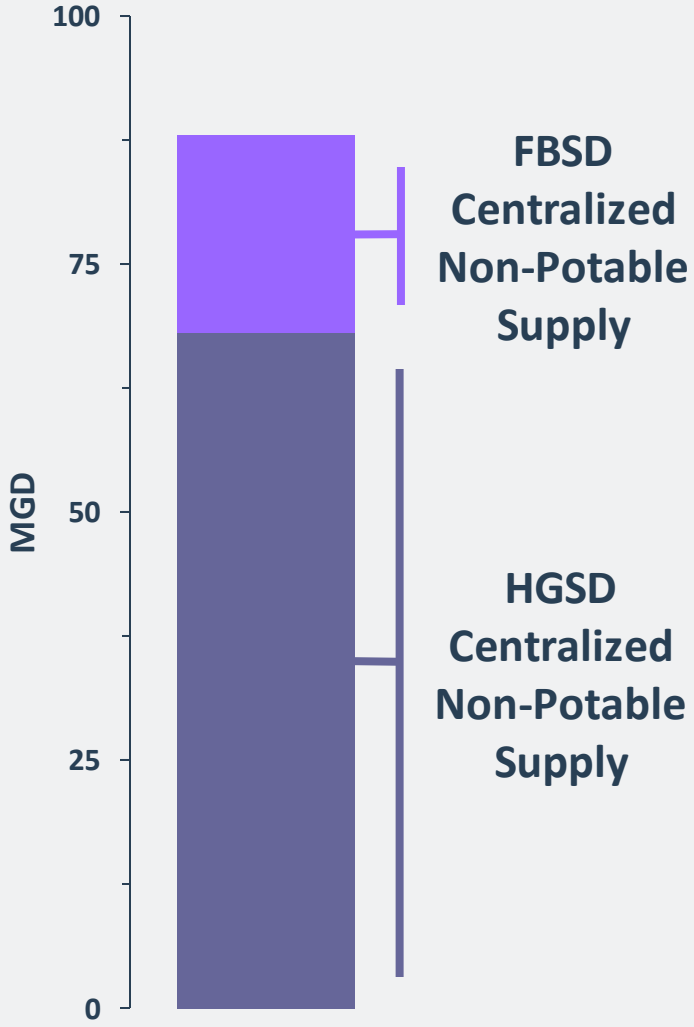
## Subsidence Impacts

No Subsidence

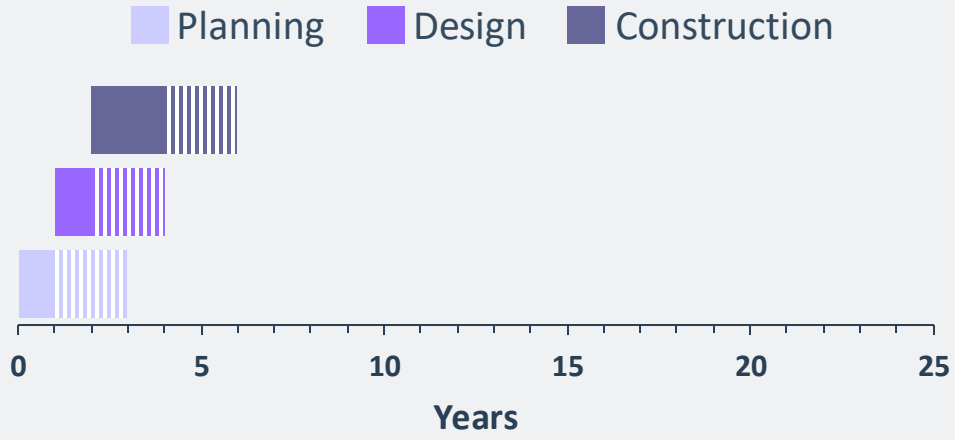
Preliminary
Subject to Revisions

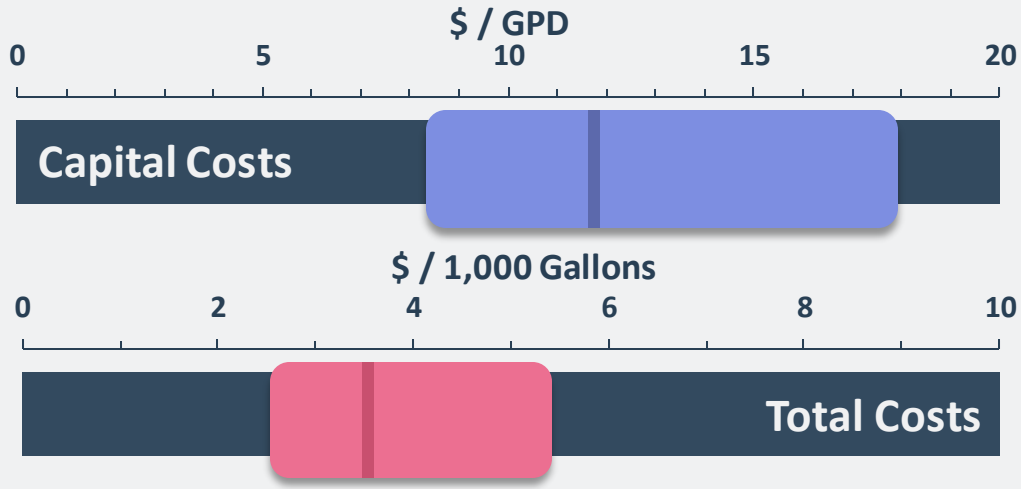
# Centralized Reclaimed Water – Non-Potable

## Magnitude of Supply




## Implementation Timeline




## Climate Resiliency

Drought-Proof

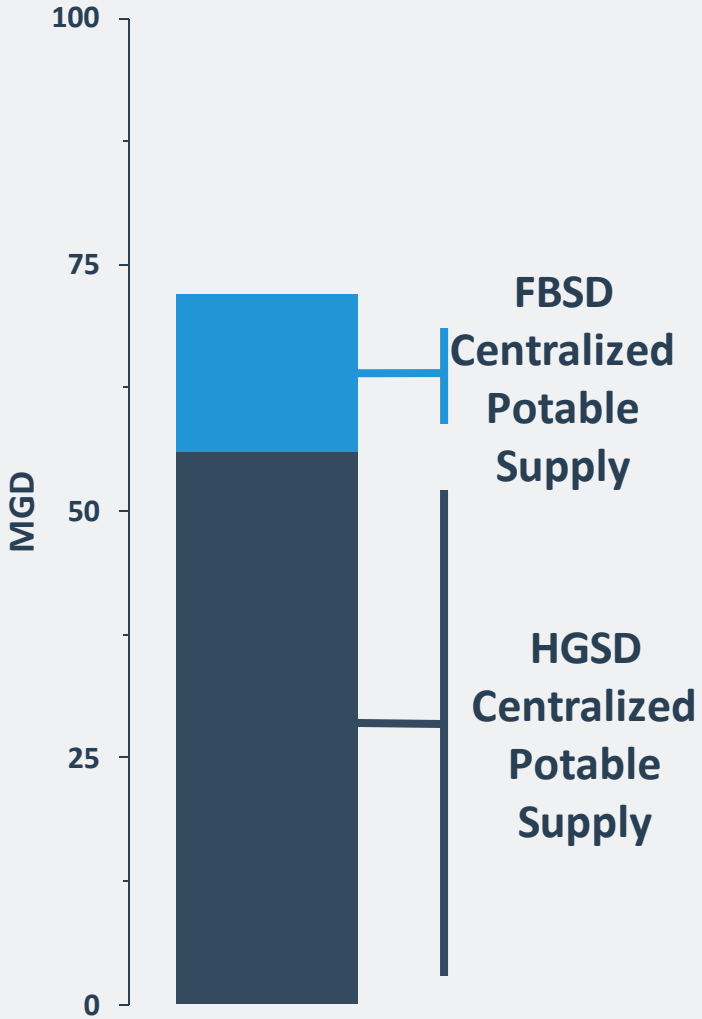
## Subsidence Impacts

No Subsidence

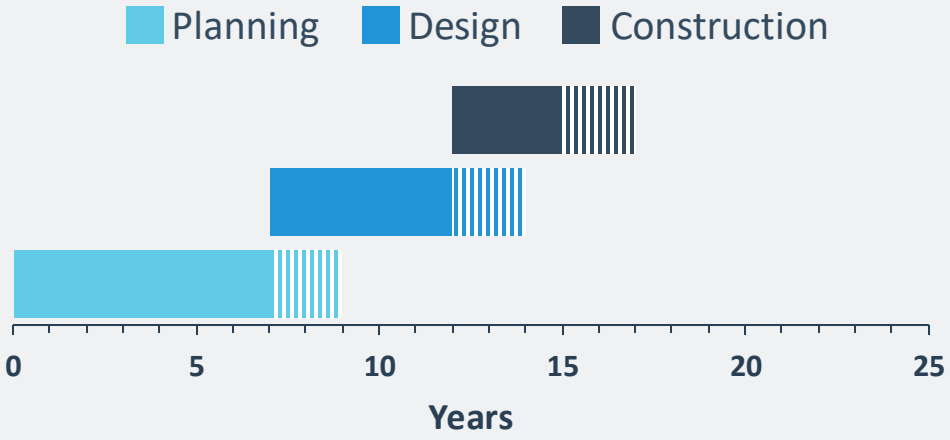
Preliminary/Subject to Revisions

# Centralized Reclaimed Water – Potable

## Magnitude of Supply



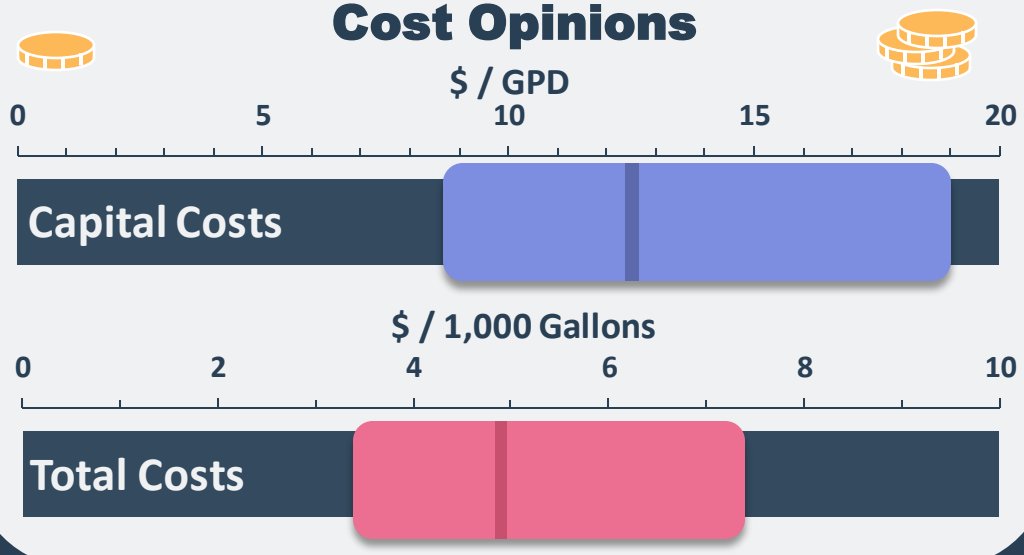

## Implementation Timeline




## Climate Resiliency

Drought-Proof

## Cost Opinions



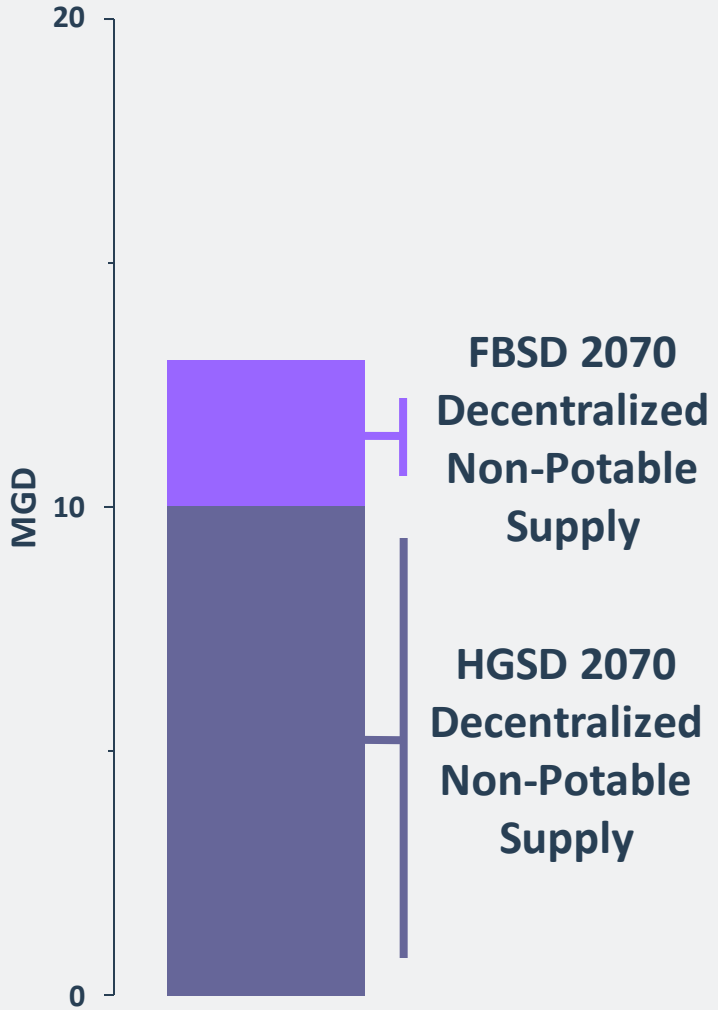

## Subsidence Impacts

No Subsidence

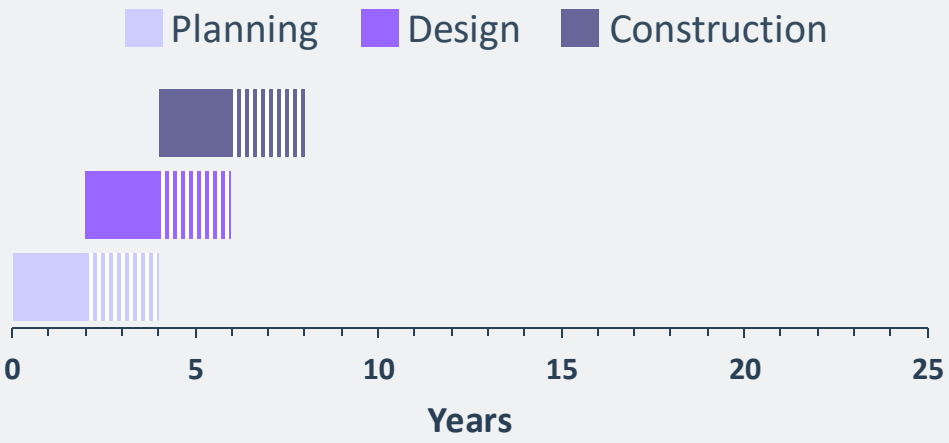
Preliminary/Subject to Revisions

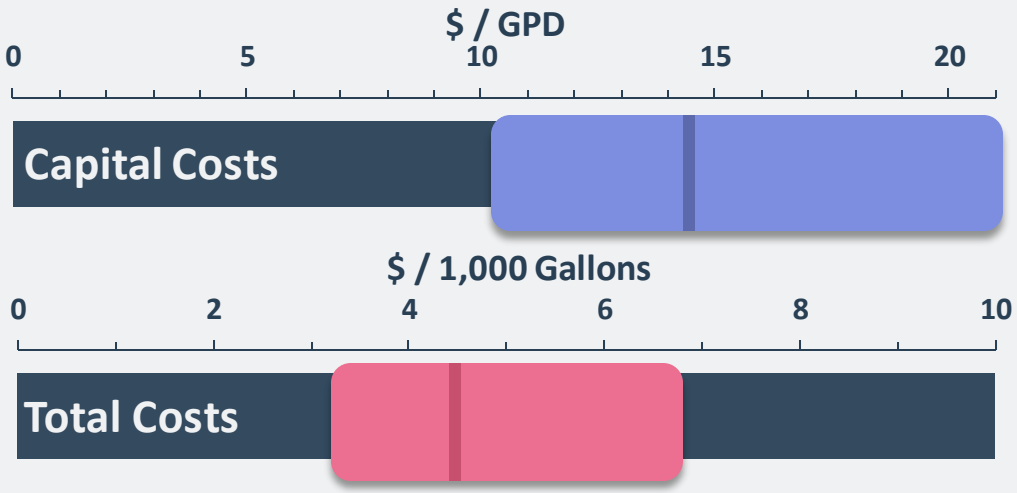
# Decentralized Reclaimed Water

## Magnitude of Supply




## Implementation Timeline




## Climate Resiliency

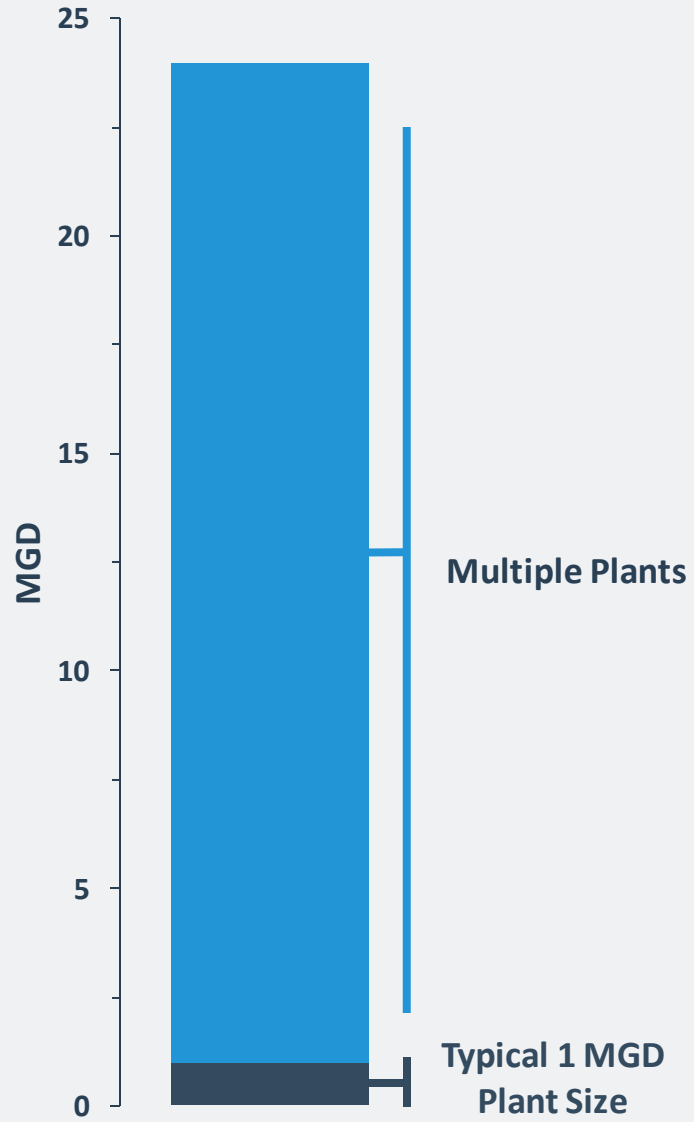
Drought-Proof

## Subsidence Impacts

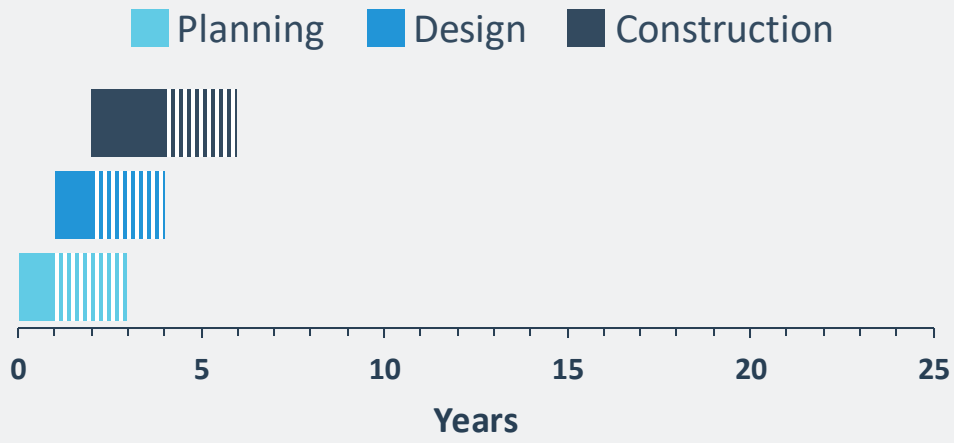
No Subsidence

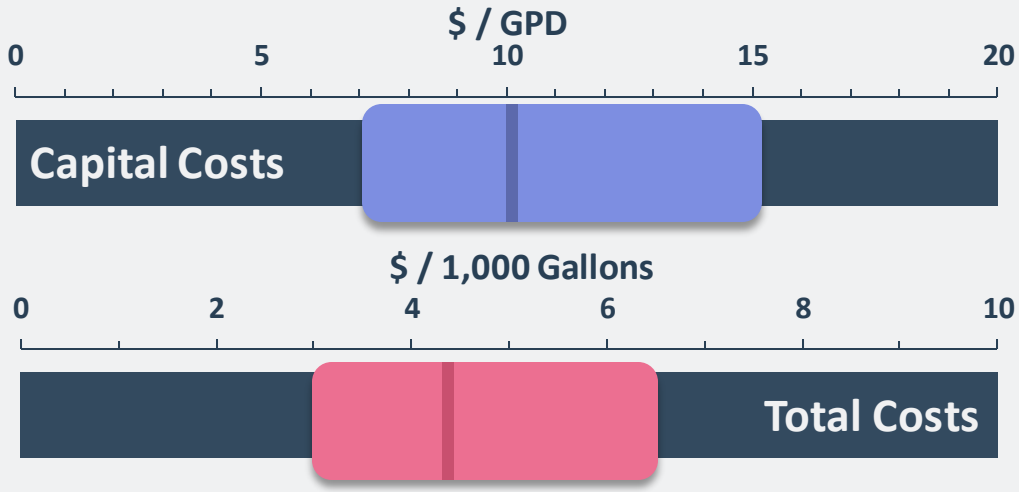
Preliminary/Subject to Revisions

# Brackish Groundwater Desalination




## Implementation Timeline




## Climate Resiliency

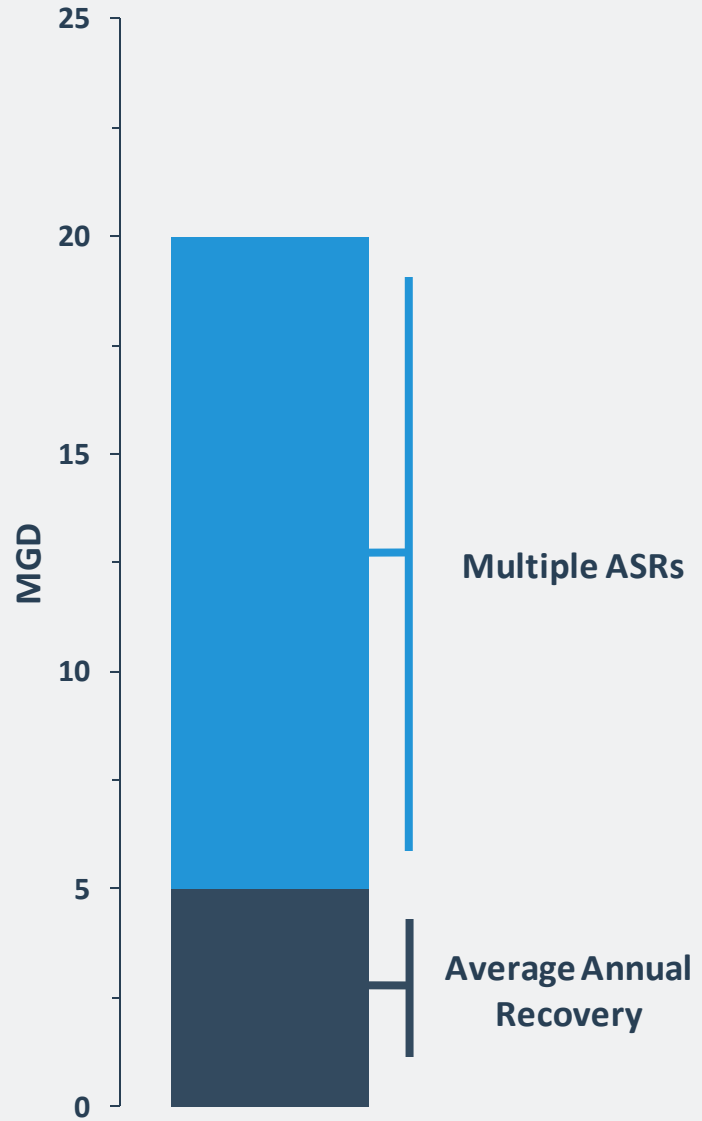
Drought-Proof

## Subsidence Impacts

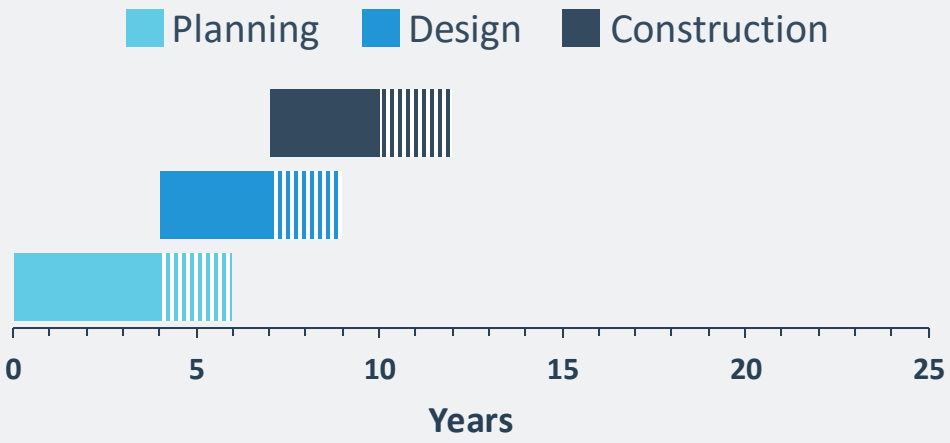
Moderate

Preliminary
Subject to Revisions

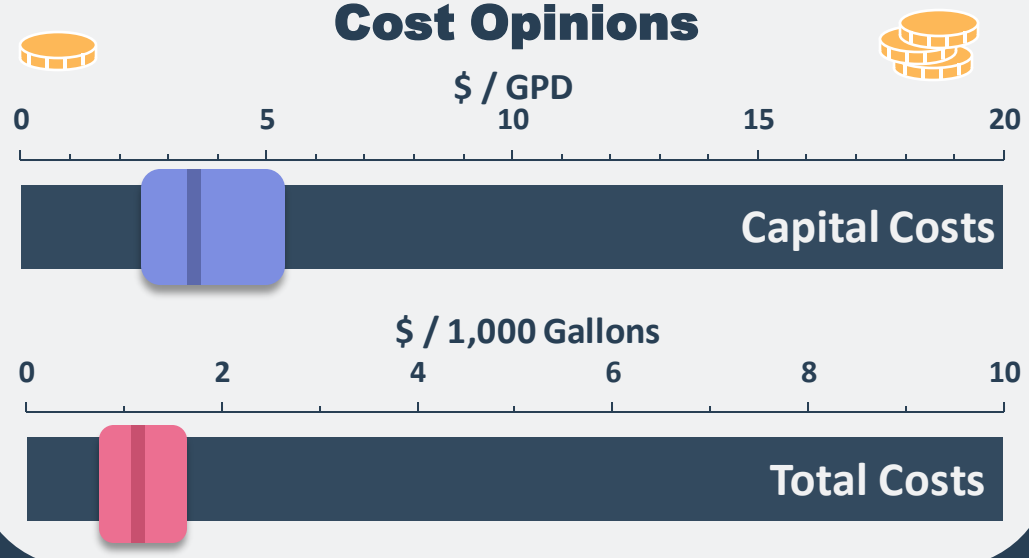
# Aquifer Storage and Recovery




## Implementation Timeline




## Cost Opinions




## Climate Resiliency

Climate Variable

## Subsidence Impacts

Moderate

Preliminary
Subject to Revisions

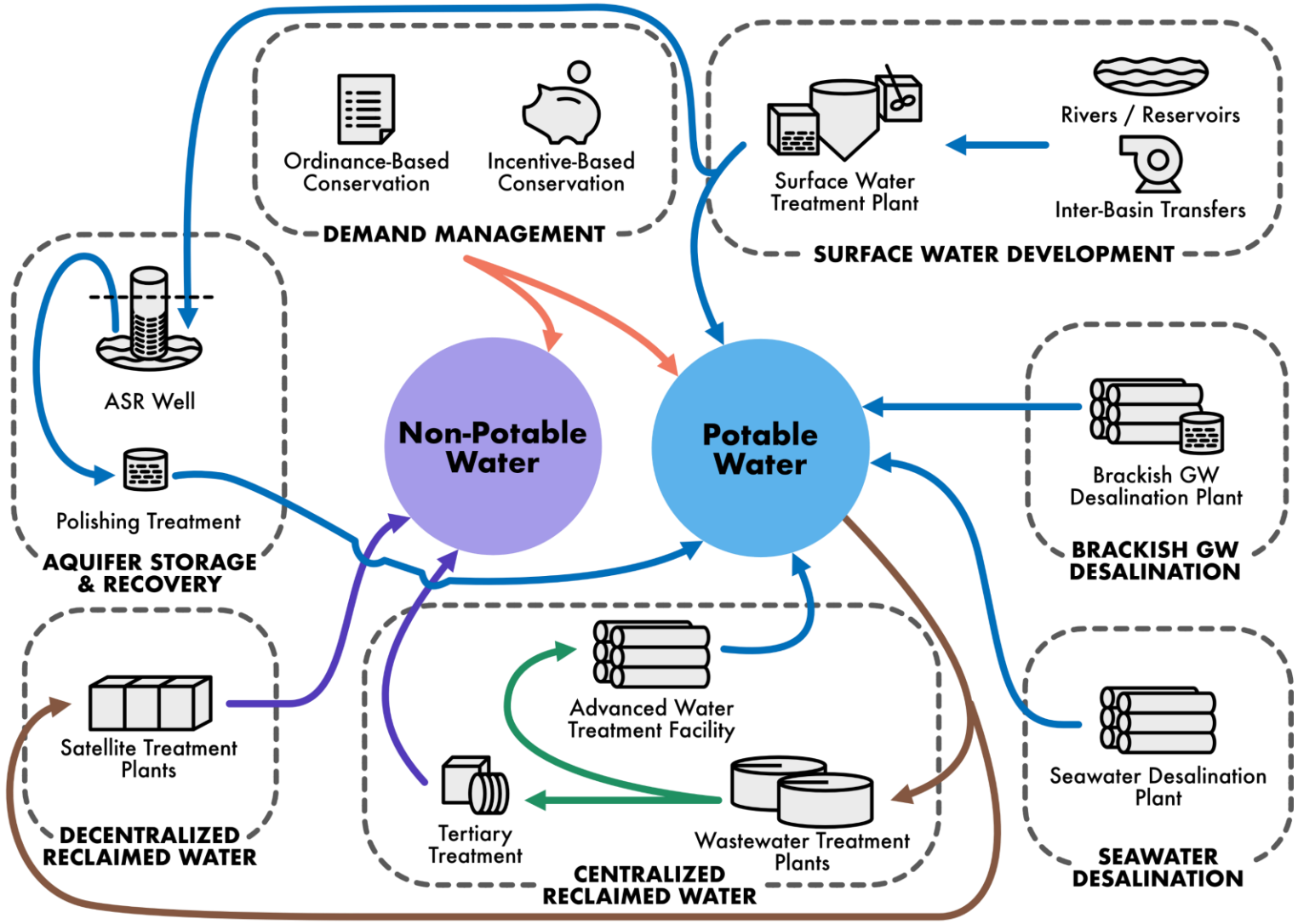
# Preliminary Findings

## Summary of Stakeholders' Preferences

| | |
|---|---|
| Strong Interest | • Surface Water Development<br>• Centralized and Decentralized Reclaimed Water<br>• Demand Management (Water Conservation) |
| Limited Interest | • Brackish Groundwater Desalination<br>• Aquifer Storage & Recovery (ASR) |
| Conditional Interest | • Seawater Desalination |

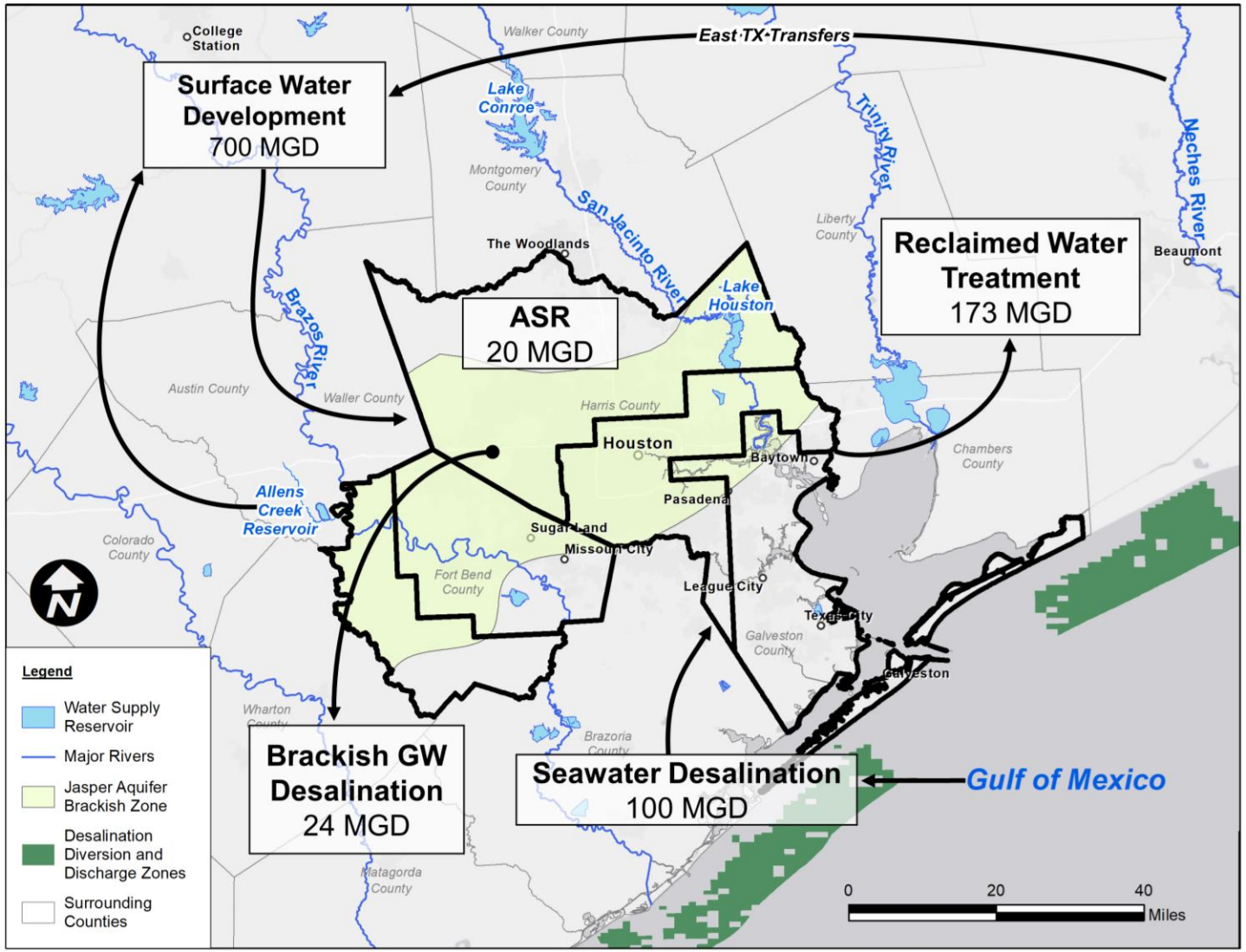
# PRELIMINARY FINDINGS

## Alternate Water Supplies - Inter-dependencies



# PRELIMINARY FINDINGS

## Alternative Water Supplies – Varying Constraints



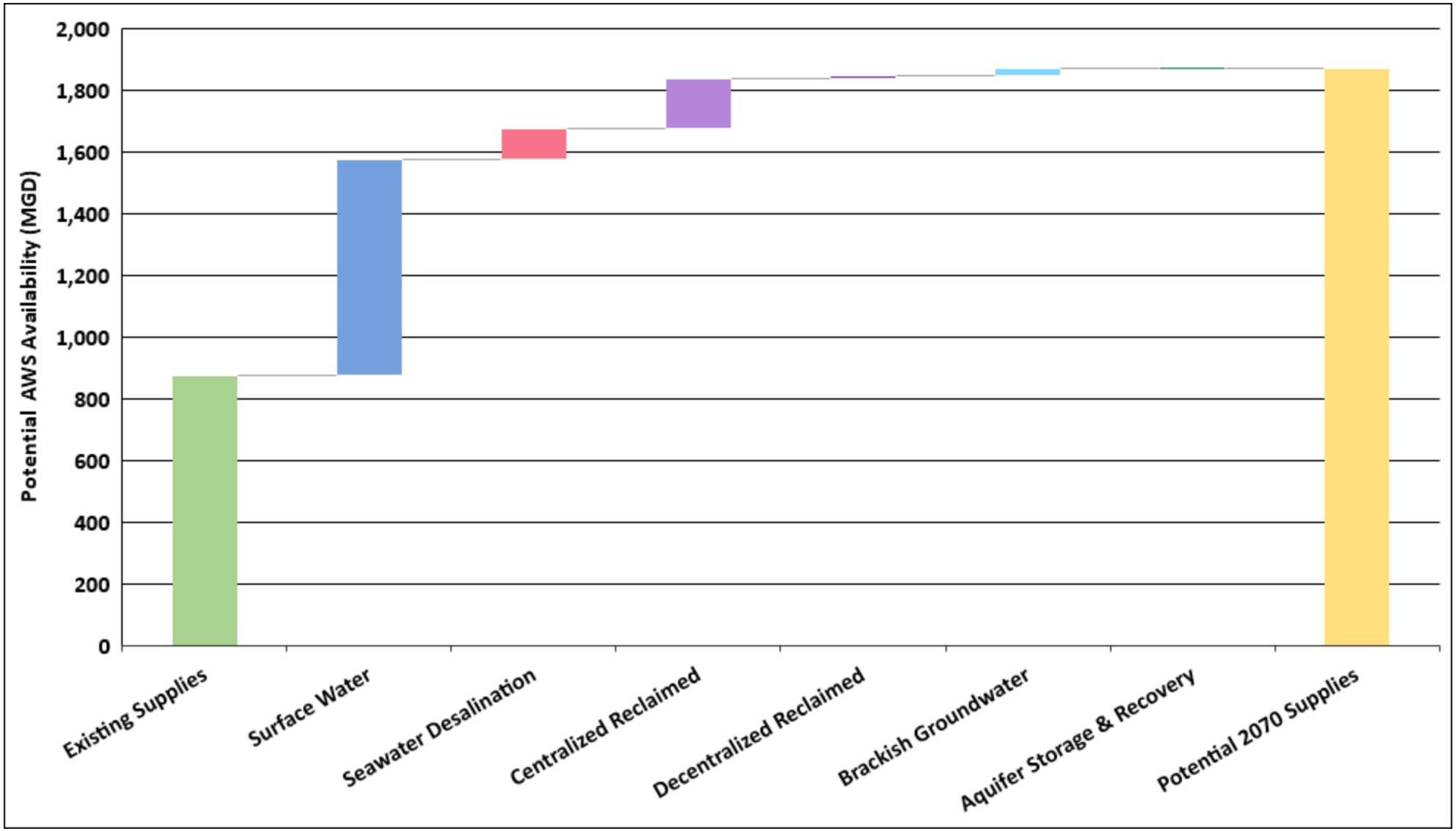
# Preliminary Findings

## Potential 2070 Alternative Water Supply Availability

| Alternative Water Supply | Magnitude of 2070 AWS Supply (MGD) |
|---|---|
| Existing Supplies | 874 |
| Surface Water Development | ~700 |
| Seawater Desalination | 100 |
| Centralized Reclaimed Water Treatment | 160 |
| Decentralized Reclaimed Water Treatment | 13 |
| Brackish Groundwater Desalination | 24 |
| Aquifer Storage and Recovery (ASR) | 20 |
| Demand Management through Conservation | 73 |

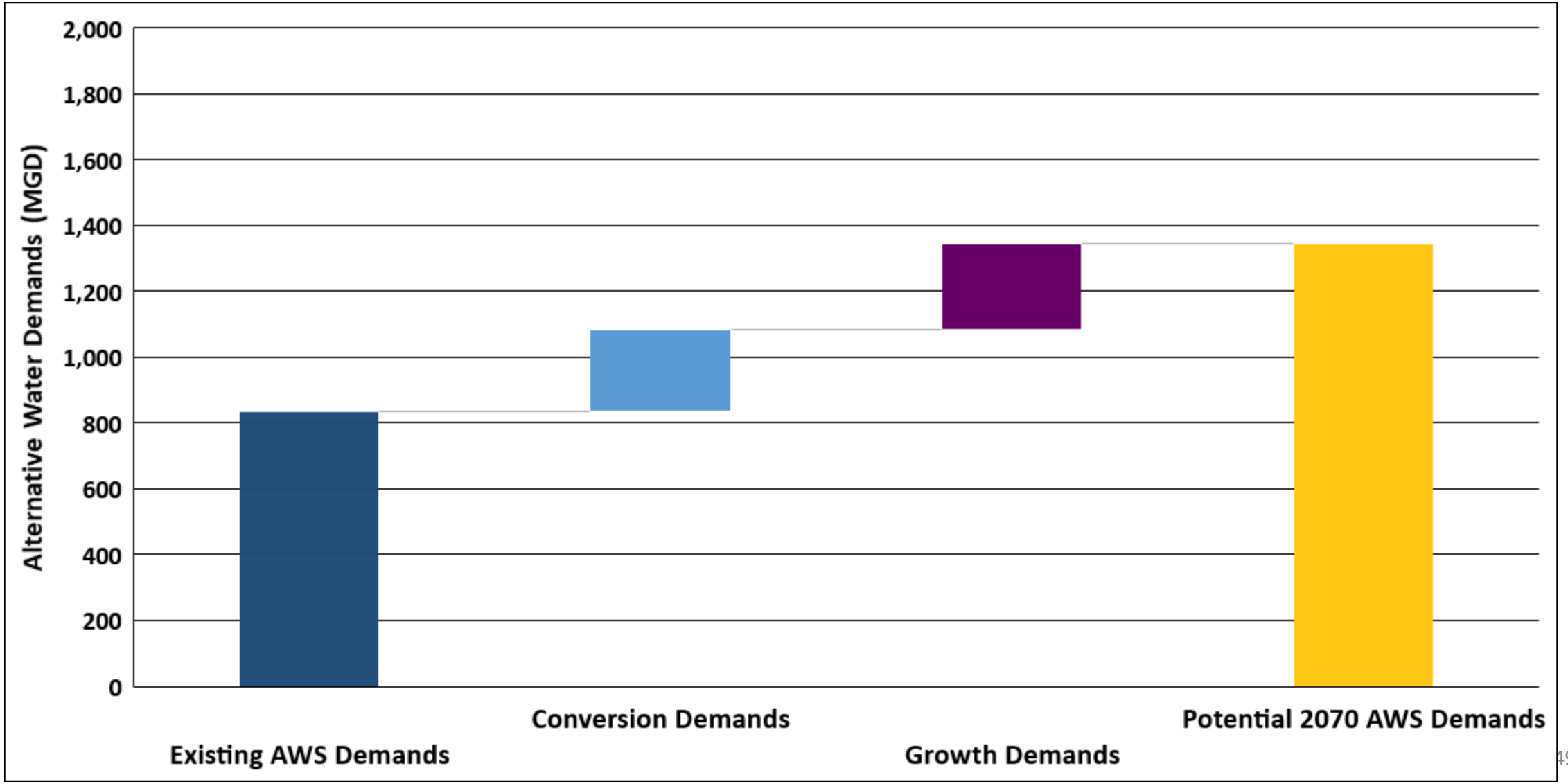
# PRELIMINARY FINDINGS

## Potential 2070 Alternative Water Supply Availability



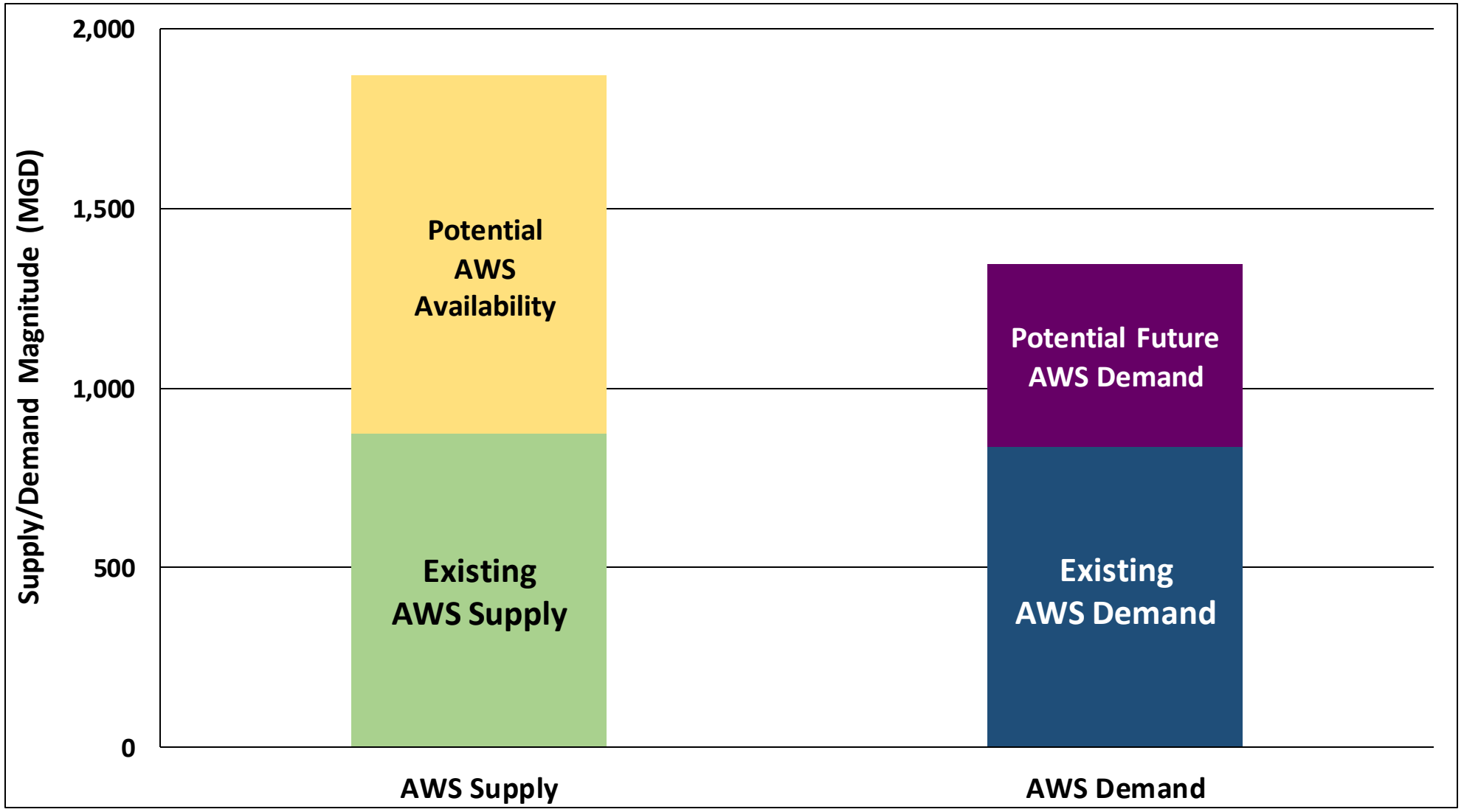
# PRELIMINARY FINDINGS

## Potential 2070 Alternative Water Demands



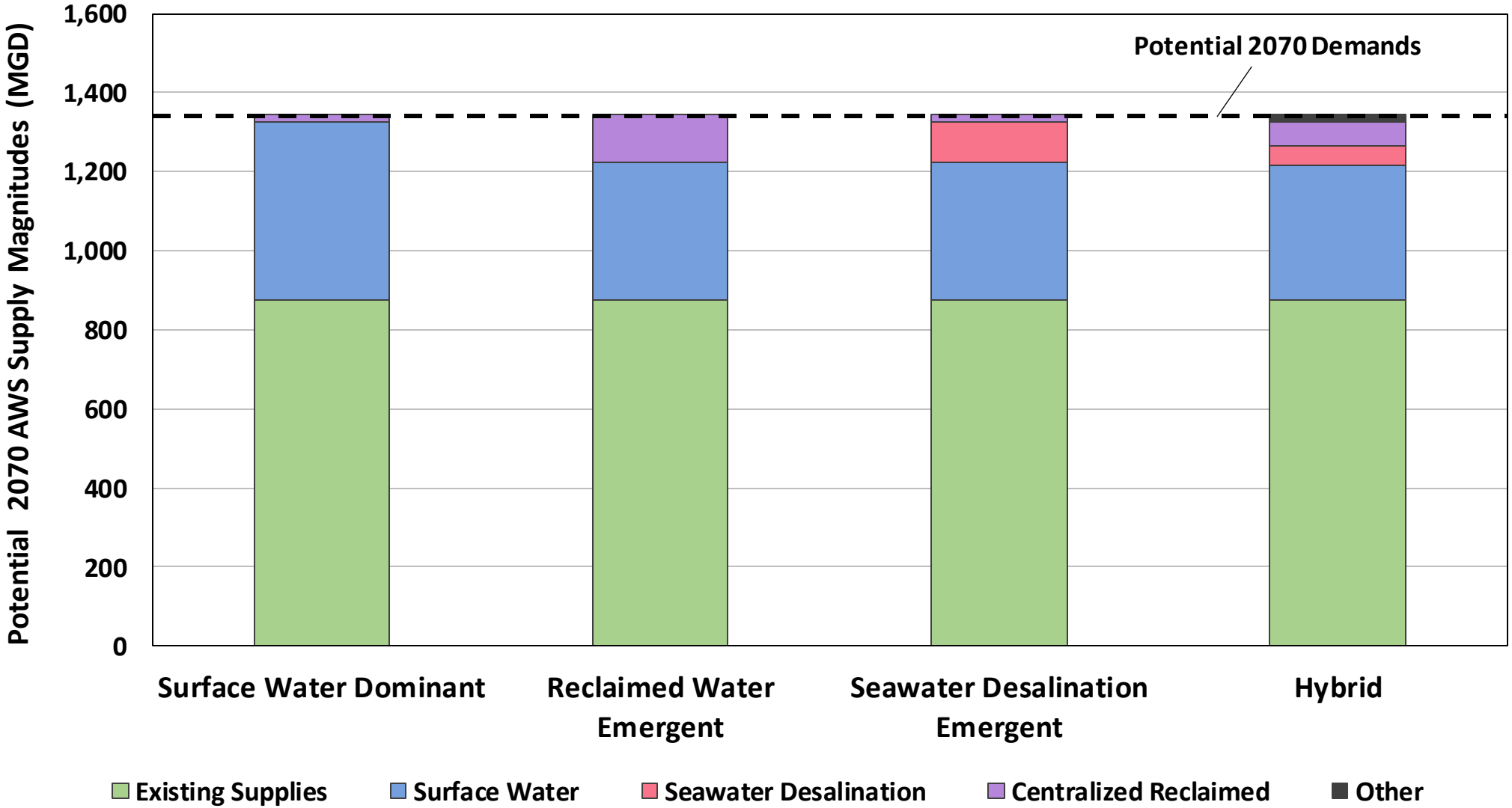
# Preliminary Findings

## Potential 2070 Alternative Water Supply versus Demand



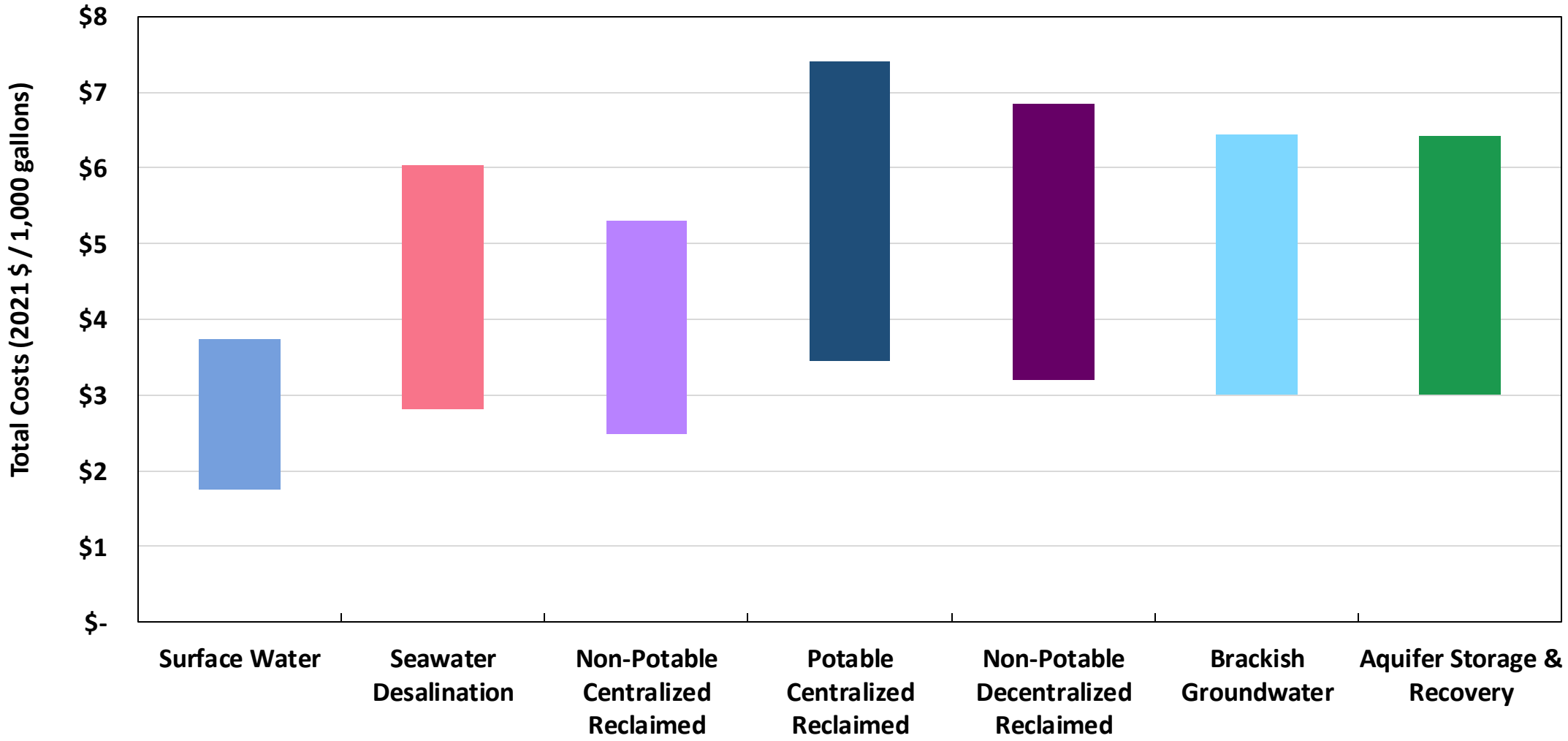
# PRELIMINARY FINDINGS

## Potential 2070 Regional AWS Portfolios



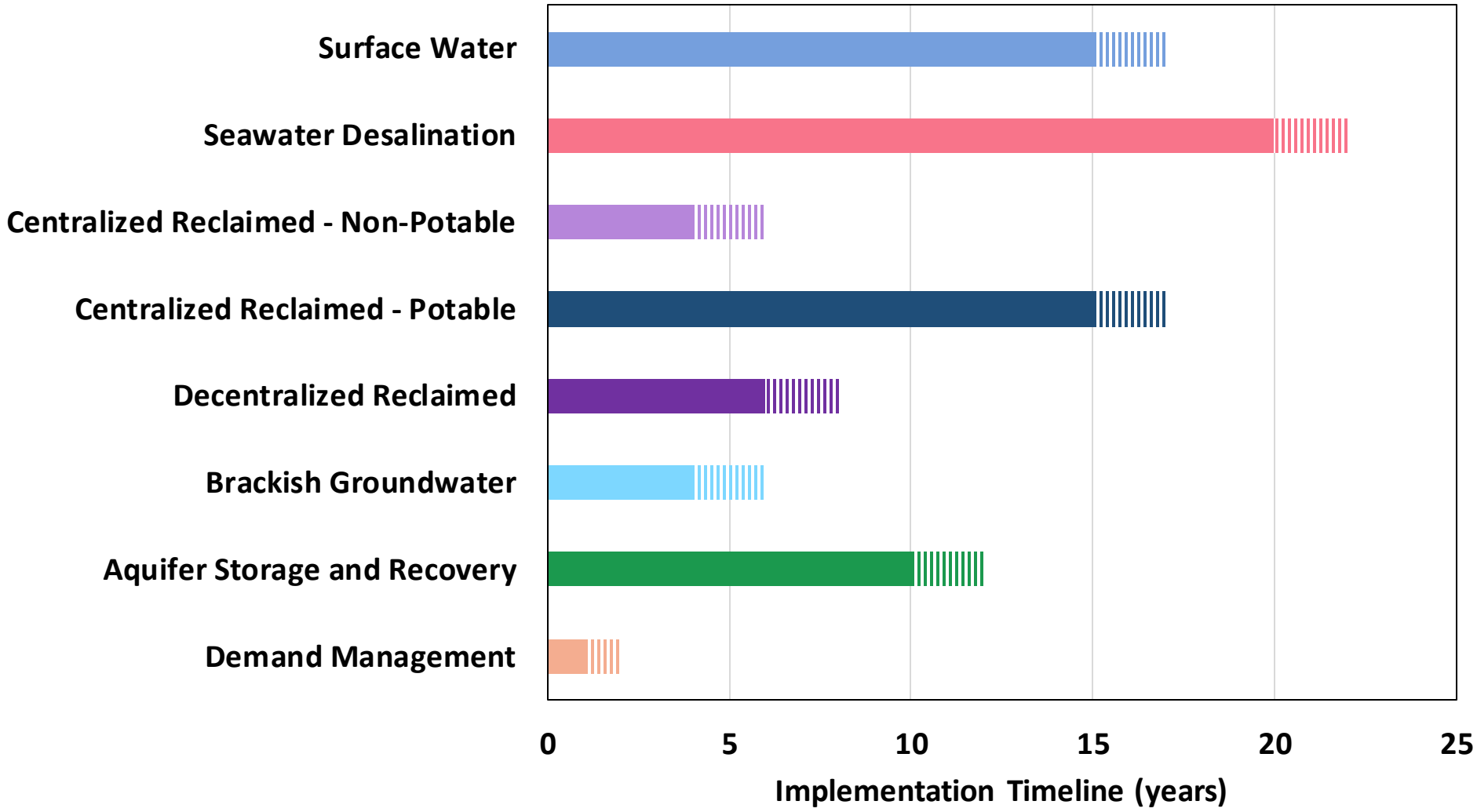
# PRELIMINARY FINDINGS

## Total Costs per Thousand Gallons ($/1,000 gallons)



# PRELIMINARY FINDINGS

## Implementation Timelines (years)



# PRELIMINARY CONCLUSIONS

## Study Conclusions

Adequate alternative water supplies are available to meet future demands in the regulatory areas

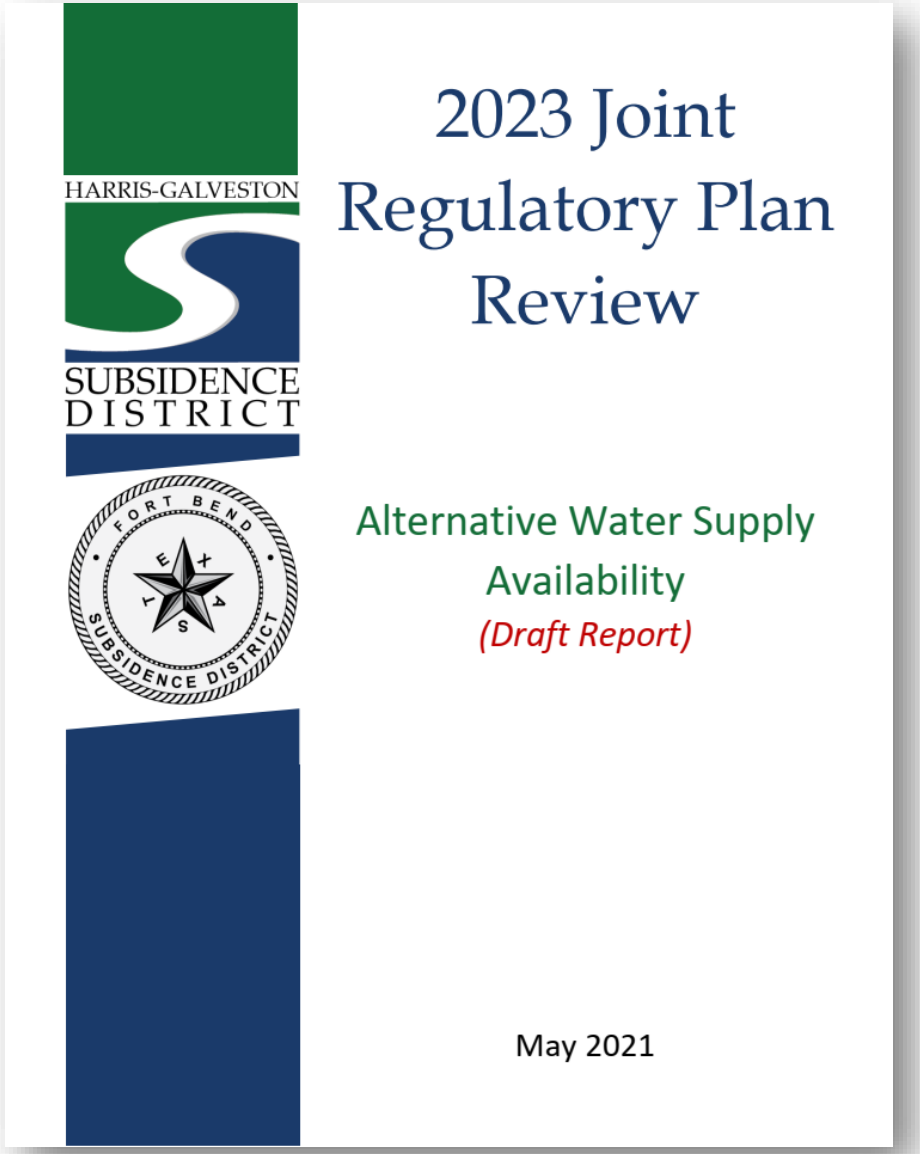
Surface water will continue to be the predominant alternative water supply

Reclaimed water will become a prominent supply for non-potable use and diversification of supplies

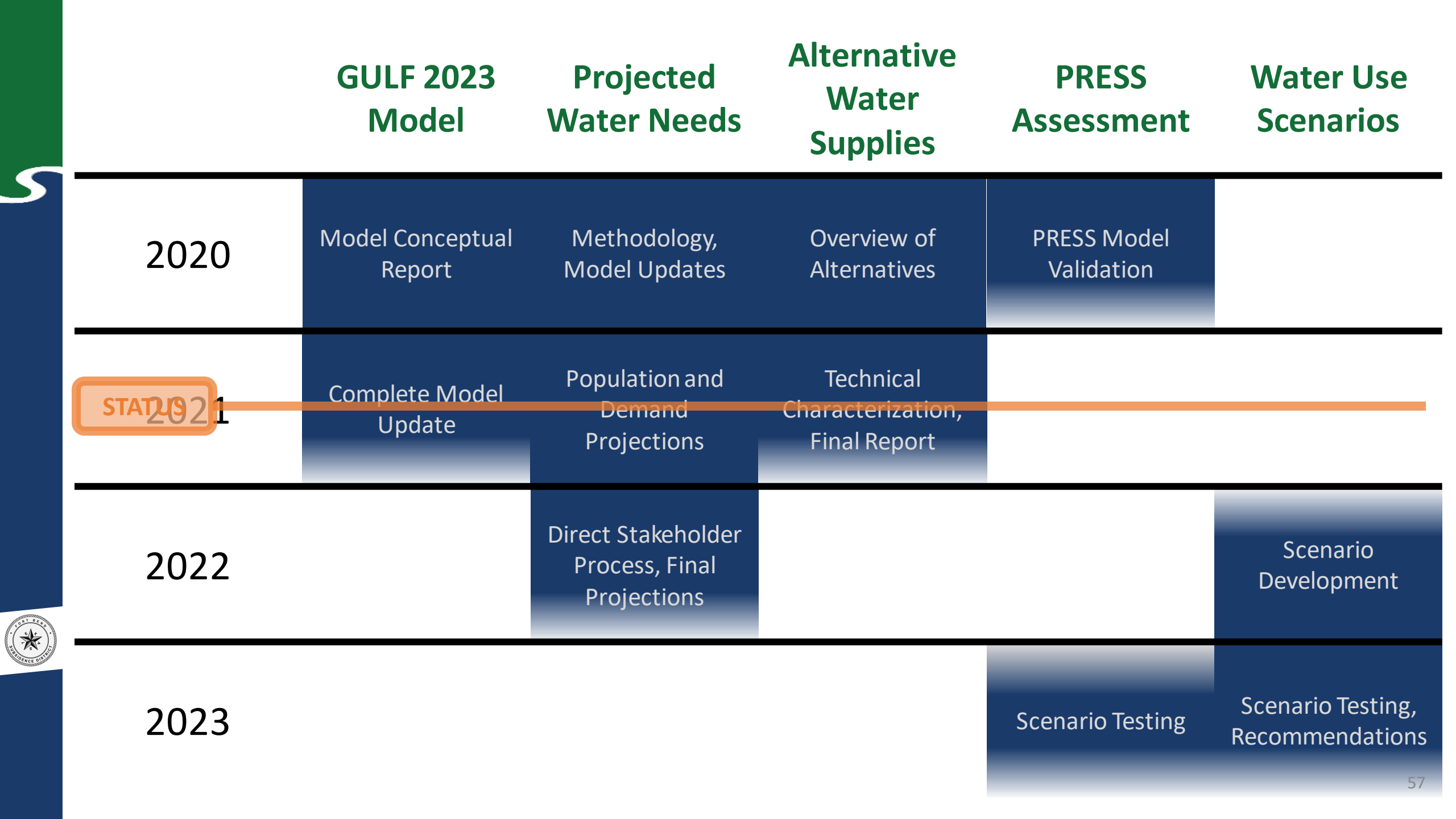
Regional coordination is needed to develop sea water supply and inter-basin transfer of surface water

# Next Steps

- Draft Alternative Water Supply Availability Report under Review
- Address Comments and Finalize Report



# Schedule and Next Steps


GULF 2023 Model
Projected Water Needs
Alternative Water Supplies
PRESS Assessment
Water Use Scenarios
2020
Model Conceptual Report
Methodology, Model Updates
Overview of Alternatives
PRESS Model Validation
2021
Complete Model Update
Population and Demand Projections
Technical Characterization, Final Report
2022
Direct Stakeholder Process, Final Projections
Scenario Development
2023
Scenario Testing
Scenario Testing, Recommendations
STATUS

# Upcoming Milestones

## December 2021

- GULF 2023 Final Model Briefing (Stakeholder Advisory Meeting 3)
- Updates on Projected Water Needs

# Questions and Answers

# Thank you for attending the Joint Regulatory Plan Review Stakeholder Meeting

## We appreciate your interest and engagement in this meeting.

If you have time, please take a moment to complete the survey at the end of this webinar. We will also include a link to the survey in a follow-up email if you cannot complete the survey now.