Integrated Water Resource Plan

Water and Sewer Board Update

September 21, 2022

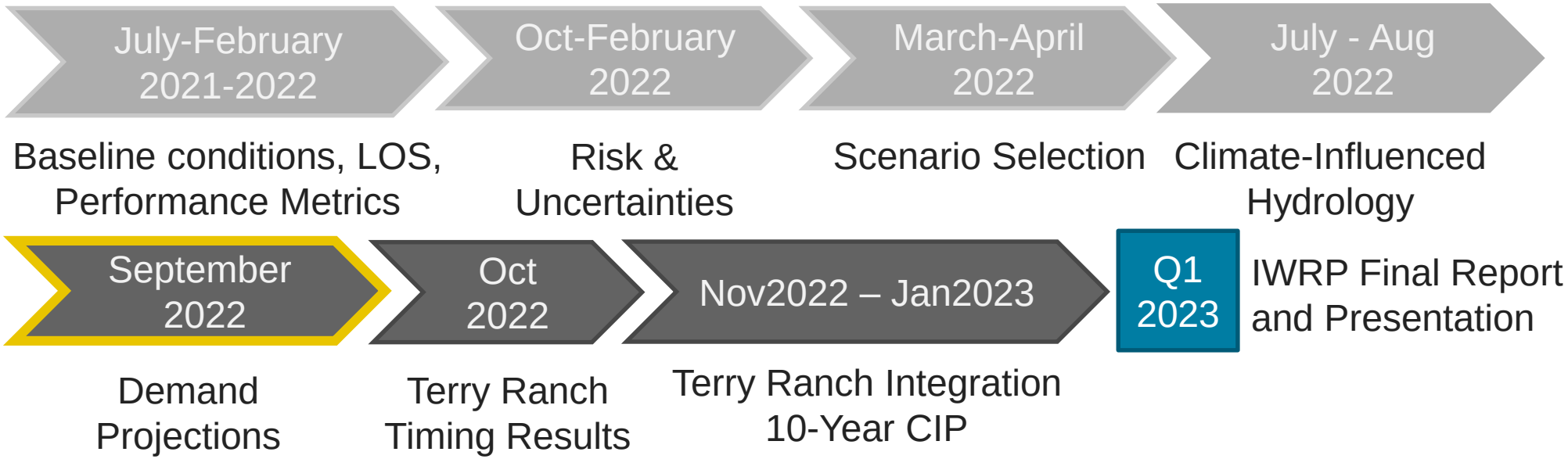
City of Greeley Colorado

Stantec

IWRP Vision Statement

"An actionable and adaptive master plan for Greeley's water resources that uses modern, defensible methods to develop a roadmap ensuring a reliable water supply for our community through an uncertain future."

IWRP Timeline



Planning Scenario Drivers

Water Rights Competition and Administration

- Yields could be reduced due to competition and changes in administration/regulation

Water Demands

- Growth rate and per capita water use uncertain

Future Climate Conditions

- Variety of long-term changes in average temperature and precipitation possible

System Risks

- Colorado River Basin yields could be impacted several ways
- Other water providers could see water supply failures

Initial Planning Scenarios

Planning Scenario Name	Water Supply System	Climate	Demands	Risks
High Bookend	Reduced Yields	Hot and Dry	Increased growth rate, Conservation II	CO Basin Reductions Increased Wildfires Increased Evaporation Regional water issues
Median	Reduced Yields	Warm	Planned growth rate, Conservation I	CO Basin Reductions Increased Wildfires Increased Evaporation
Low Bookend	Expected Yields	Warm and Wet	Reduced growth rate, Conservation III	CO Basin Reductions
No Climate Change	Expected Yields	No Change	Planned growth rate, Conservation II	CO Basin Reductions
Mix and Match	Reduced Yields	Hot and Wet	Planned Growth rate, Conservation III	CO Basin Reductions Increased Wildfires Regional water issues

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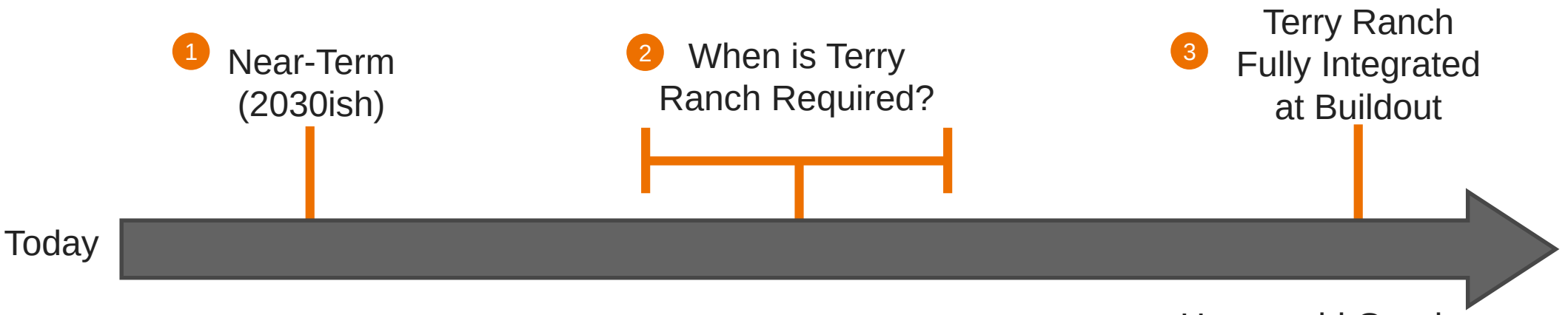
Demand Scenarios

Demand Scenario	Included Planning Scenarios	Demand Driver Settings
High Bookend	High Bookend, No Climate Change	High population growth, Conservation II
Median	Median	Medium population growth, Conservation I
Low Bookend	Low Bookend, Mix and Match	Low population growth, Conservation III

Planning Horizons



- Water resources projects for the next 10-20 years

How is the timing of Terry Ranch affected by:

- Demand growth
- Climate change
- Water rights portfolio
- Other Risks

- How could Greeley use Terry Ranch?
- What is a sustainable use of Terry Ranch?

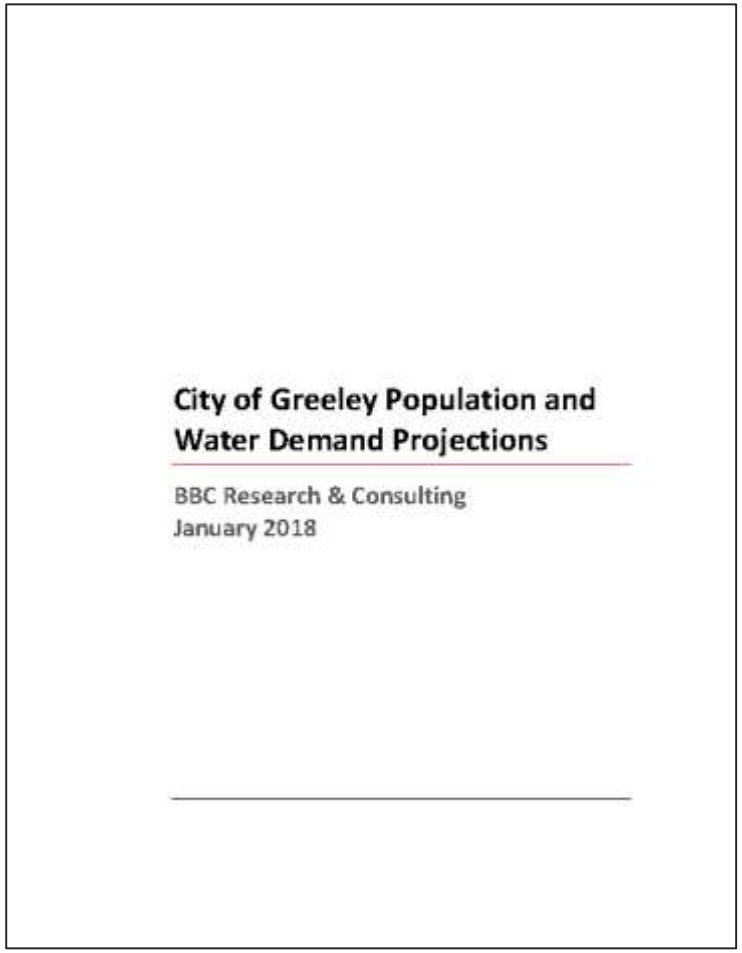
Demand Forecasts for IWRP

BBC Research & Consulting

Doug Jeavons

- Milton Seaman EIS Purpose and Need 2014-2017
- Greeley Cash-in-Lieu of Water Dedication 2015
- Greeley Water Requirements for Commercial Uses 2018
- Greeley Revised Alternative Screening Process 2019
- Greeley Drought Plan 2019-2020
- Fort Collins Cash-in-Lieu Update 2016-2017
- Denver Water Demand Projections various years
- Aurora Water Demand Projections 2014-2015
- Colorado Springs Utilities Demand Forecasts 2022

Greeley water demand model


City of Greeley Population and Water Demand Projections

BBC Research & Consulting
January 2018

History:

- Originally developed in 2014-17
- Used for Milton Seaman permitting
- Enhanced and updated for 2019 Revised Alternative Screening (RAS) analysis
- Projects annual indoor and outdoor water use by customer class

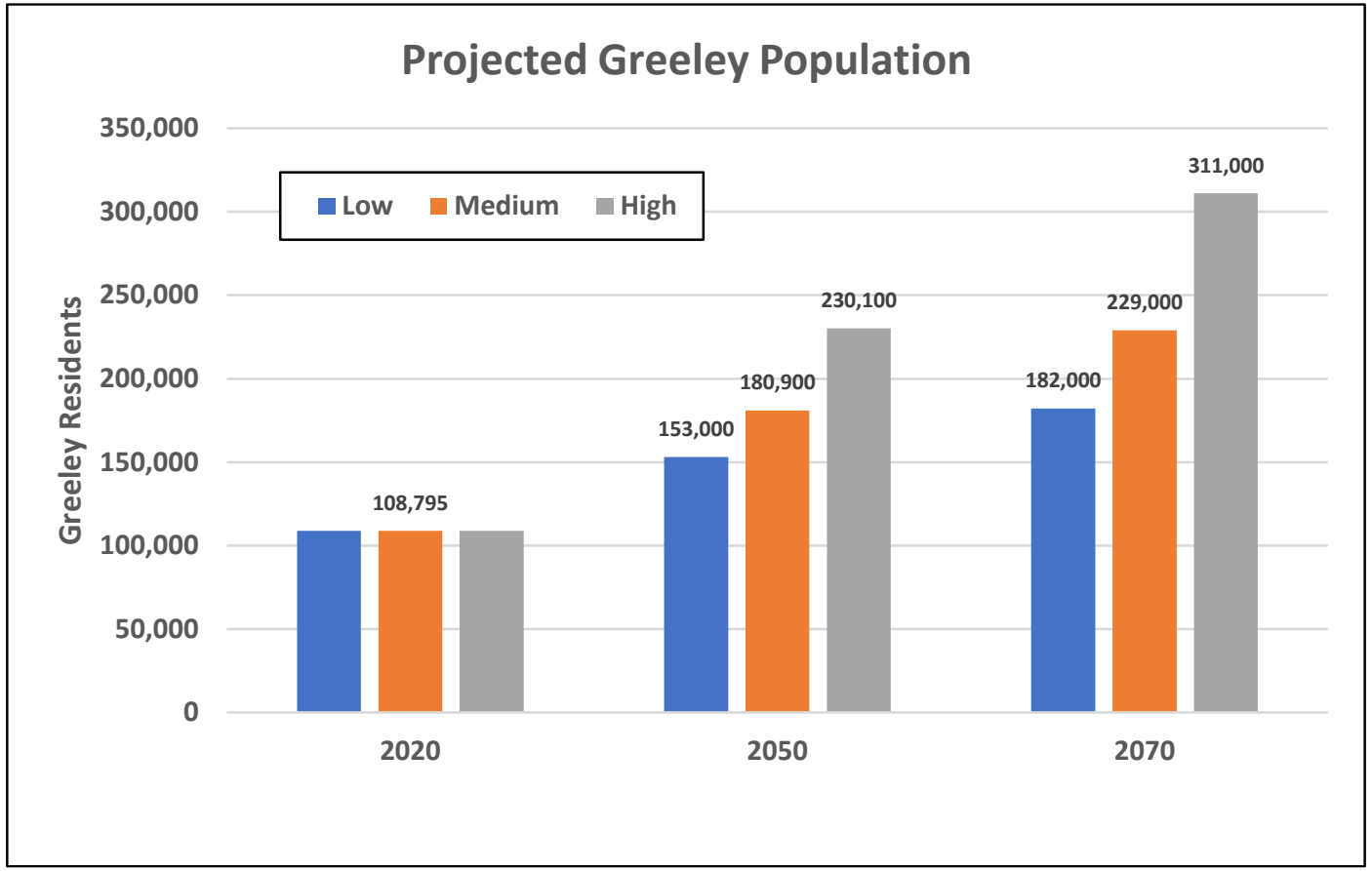
Key inputs for Master Plan:

- Population
- Climate/irrigation rate
- Water price/conservation

Updated Greeley Population Projections

Key components:

- Updated Weld County forecasts from State Demographer (SDO)
- Low and high county growth scenarios from the Water Plan (76% to 140% of SDO growth)
- Greeley's share of future Weld County growth
  20% -- Low
  25% -- Medium
  30% -- High



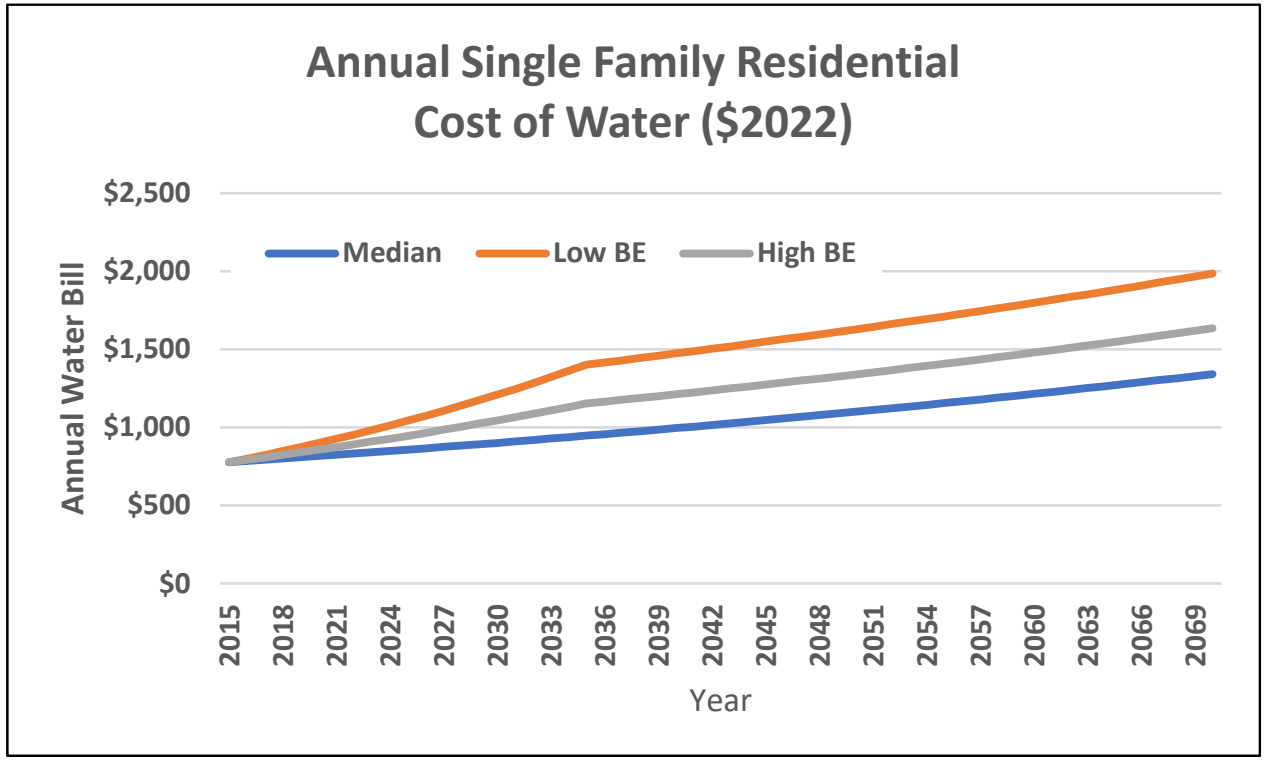
Other Scenario Settings for Future Demands

Historically Greeley had ~40% Multi-Family Development

Planning Scenario Name	Population Scenario	Climate Increase in Irrigation Rate	Conservation (Price Increases)	Multi-family Share of New Housing Units
High Bookend	High Growth	37%	Level II	40%
Median Scenario	Medium Growth	25%	Level I	40%
Low Bookend	Low Growth	12%	Level III	50%
No Climate Change	Medium Growth	0%	Level II	40%
Mix and Match	Medium Growth	25%	Level III	50%

Water Use Efficiency (Conservation)

- Driven by price (rate) assumptions
- All scenarios assume water continues to get more expensive (beyond basic inflation)
- Annual cost per Single Family Residence more than doubles by 2070 under Low BE scenario; increases by about 60% under Median scenario



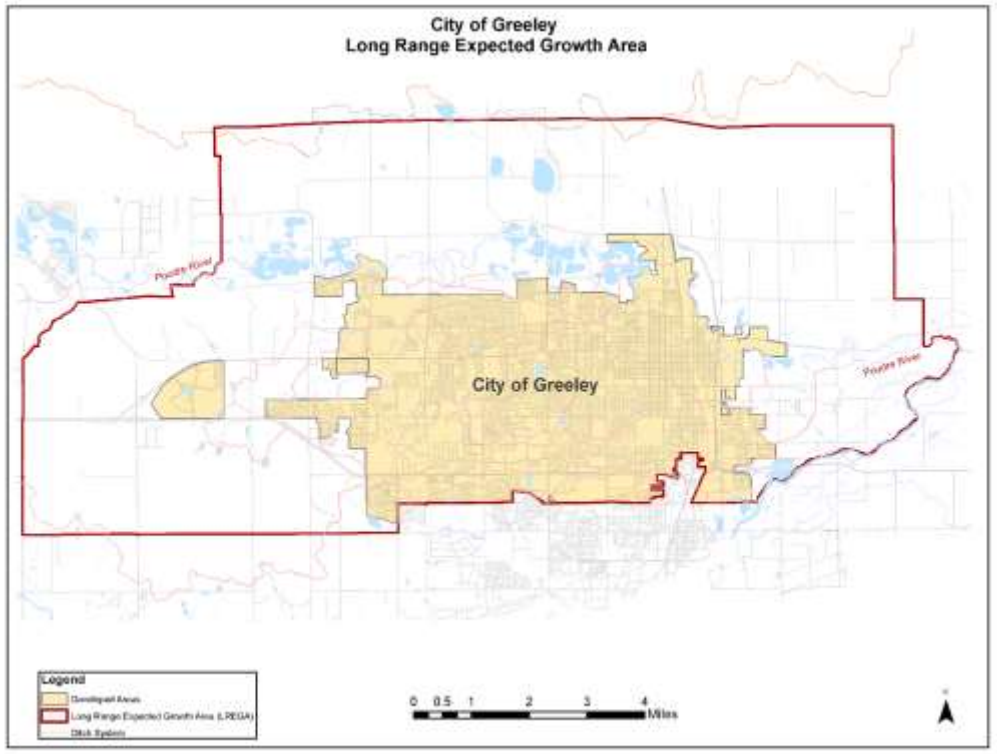
IWRP Projected Demands

Scenario Name	Projected Demand (acre-feet per year)		
	2030	2050	2070
Median	34,400	45,800	55,400
High Bookend	37,200	56,300	74,000
Low Bookend	28,600	33,300	37,600

2070 Demand Projection Details

	Population	Total Water Requirements (acre feet per year)	Systemwide Gallons Per Capita Day	Residential Gallons Per Capita Day
Current	*109,000*	*27,000*	*210*	*110*
2070 Projections				
Median	229,000	55,400	204	110
High Bookend	311,000	74,000	201	107
Low Bookend	182,500	37,600	173	87

What could "buildout" look like?



Factors:

- LREGA assumed to remain same
- Avg. residential density assumed to increase by about 30% (7 units/acre to 9 units/acre)
- Density decreases water use per capita, but increases use per acre
- Population growth rate affects timing

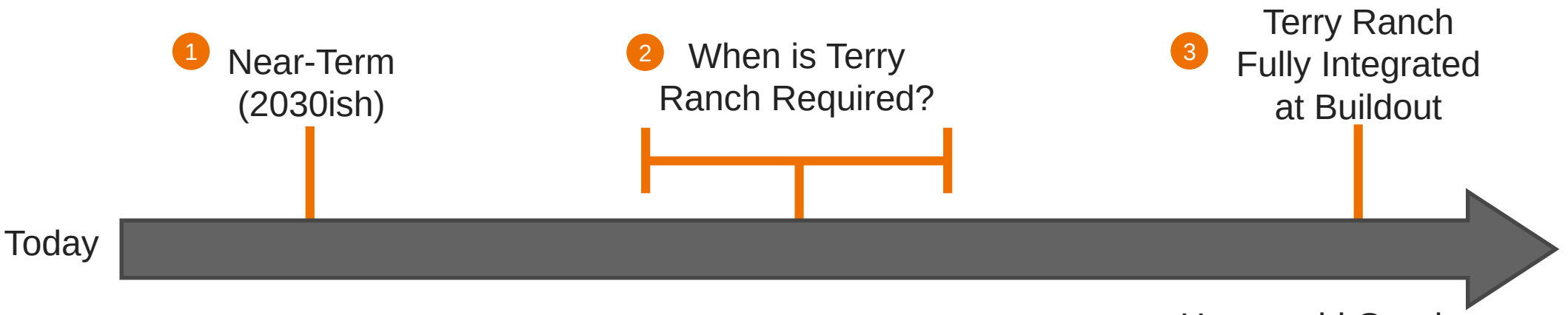
Projections:

- Buildout population would be about 420,000
- Timing between 2097 (High Bookend) and 2232 (Low Bookend)
- Total water requirements of about 83,000 to 98,000 acre-feet per year

LREGA is Long Range Expected Growth Area

How will demand forecasts be used?

Planning Horizons



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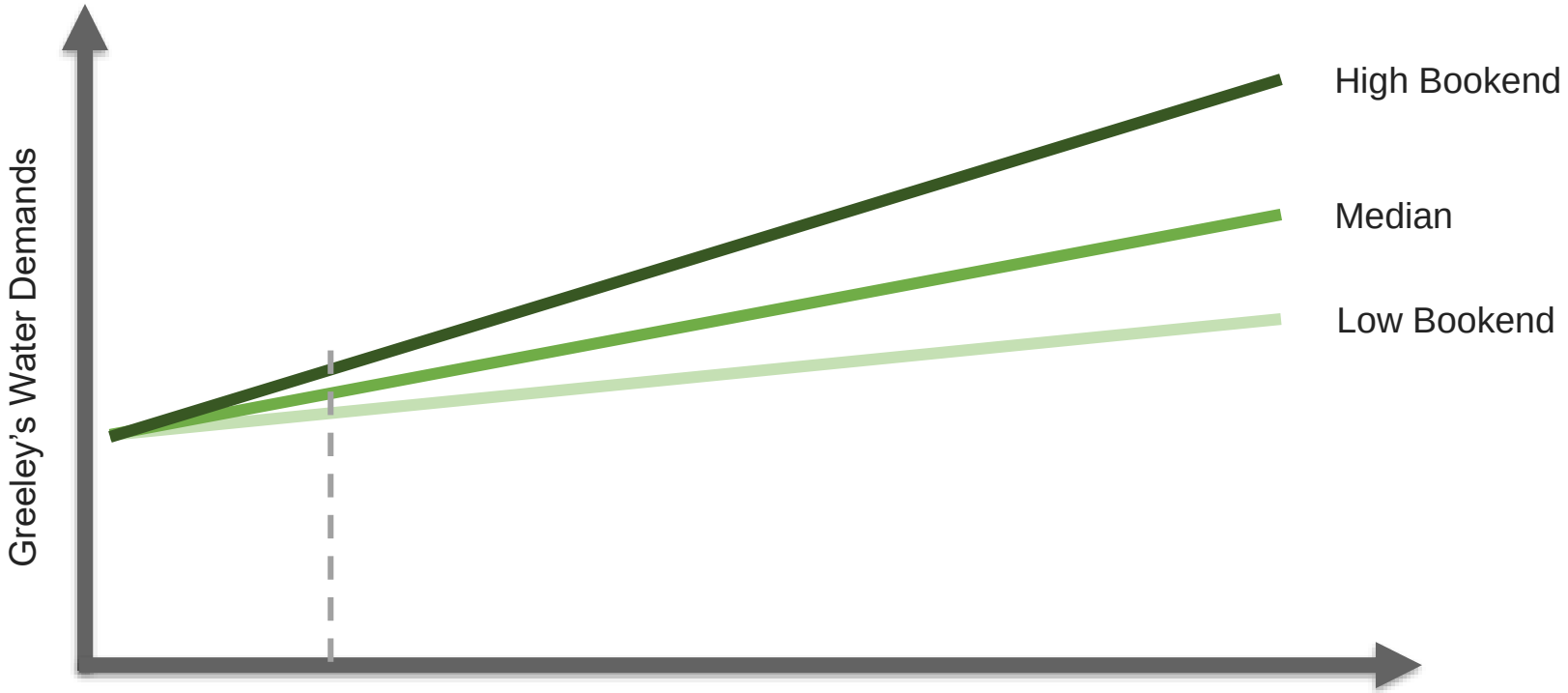
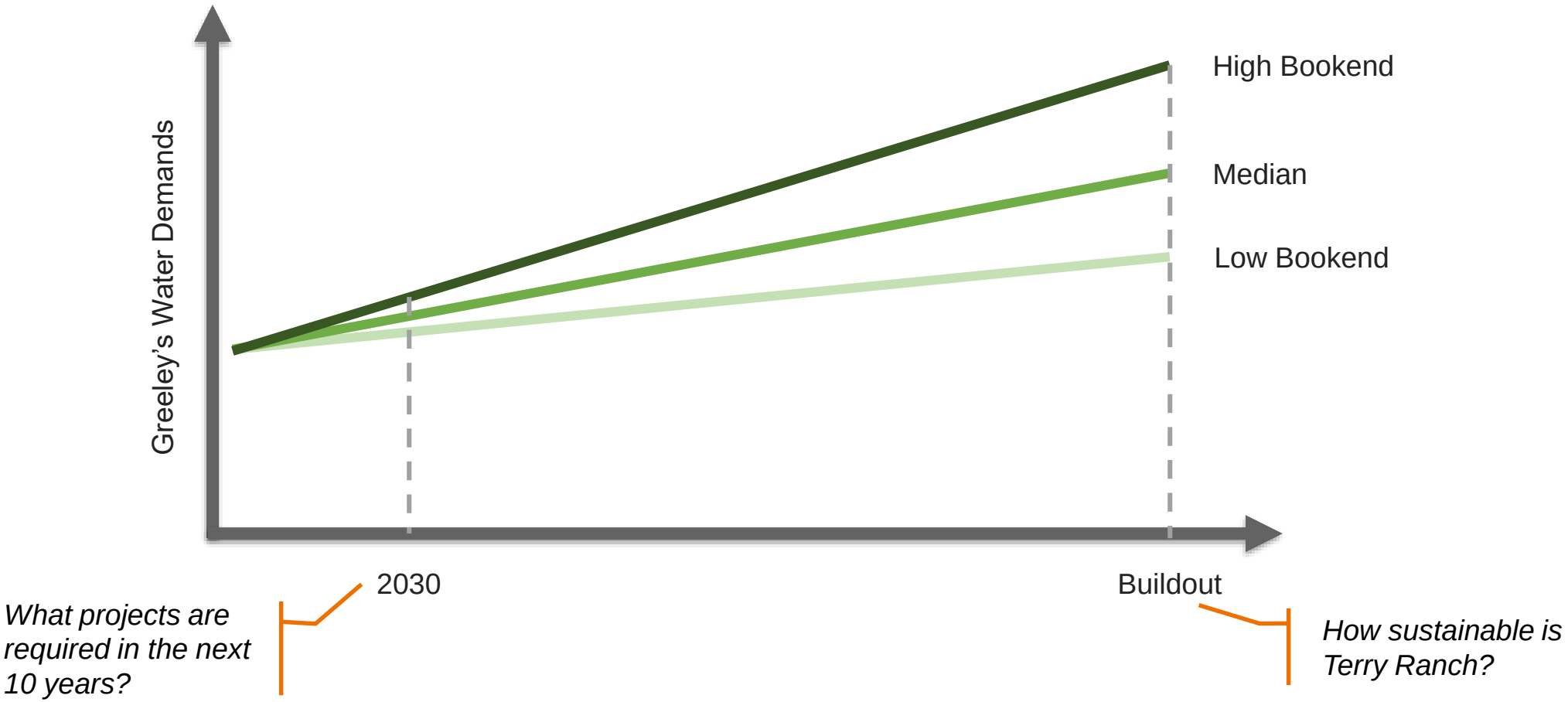
Demands and Planning Horizons



What projects are required in the next 10 years?

Demands and Planning Horizons



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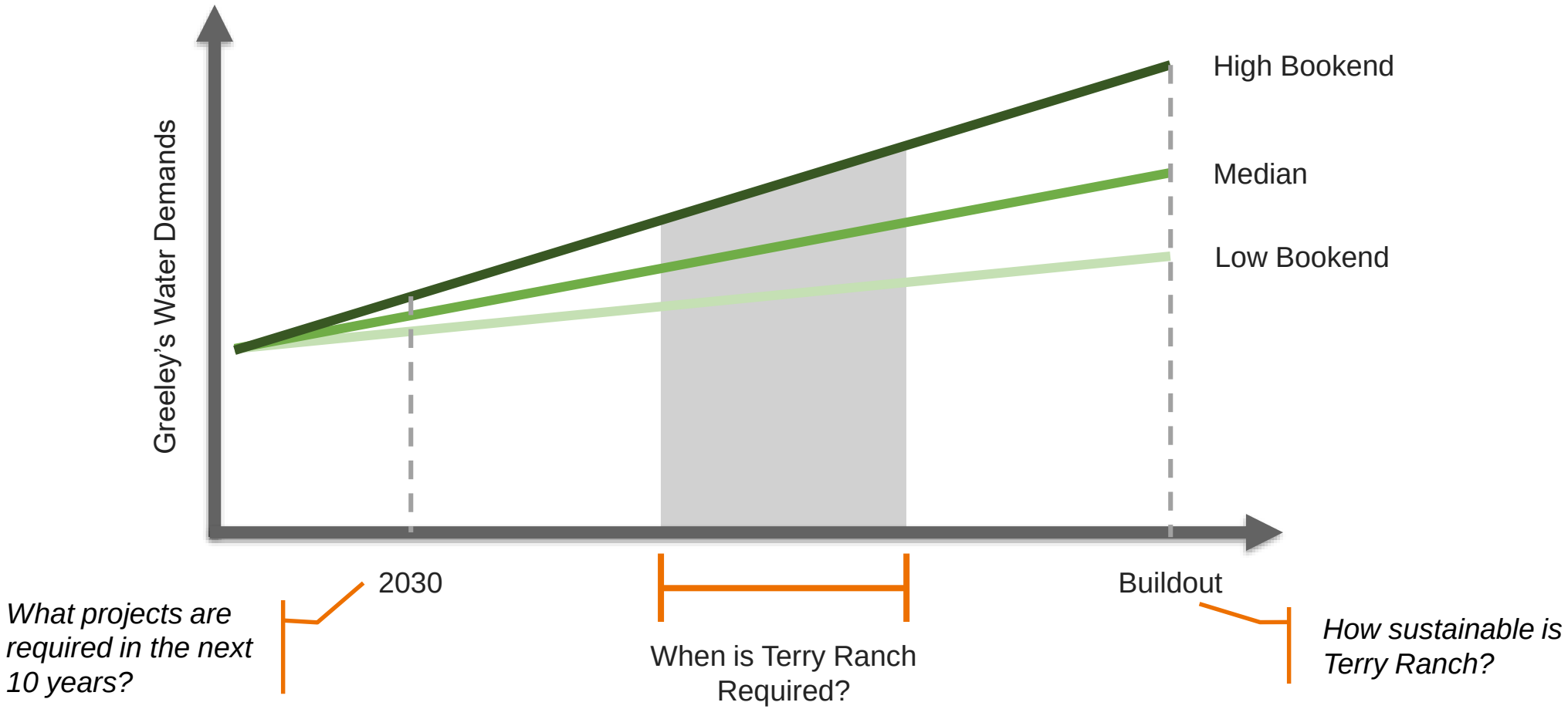


Applying Demand Forecasts

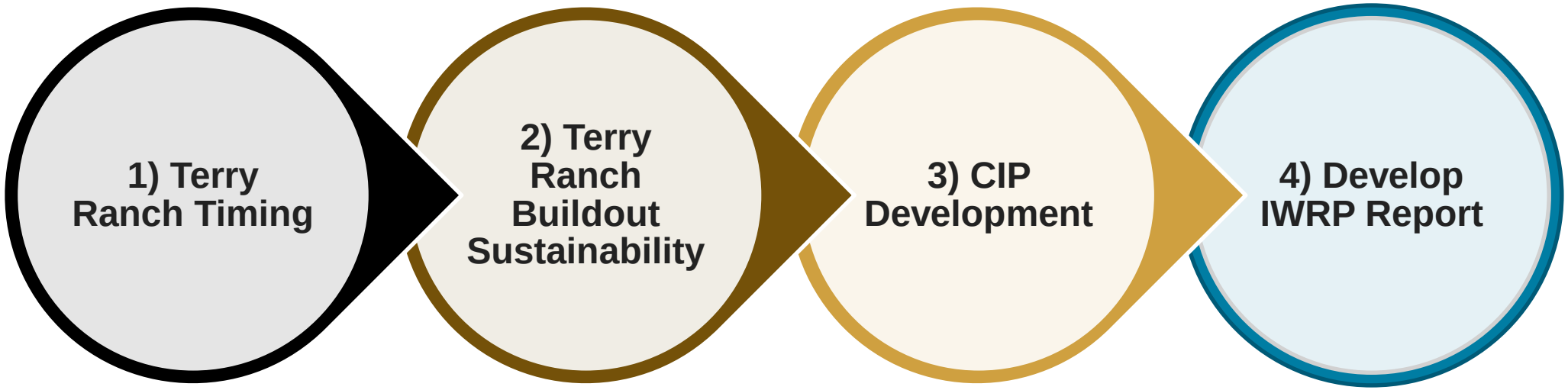
2030 and Buildout

- Simulate water supply system using forecasted demands for each Planning Scenario
- Develop portfolio such that performance is acceptable

Terry Ranch Timing

- Simulate water supply system under range of possible future demands (30,000 to 50,000 acre-feet per year)
- Determine at what demand performance becomes unacceptable
- Align with demand forecasts to establish potential timing

Next Steps



- When does Terry Ranch need to be online?
- How sustainable is Terry Ranch's used in the Planning Scenarios?
- What are the costs and timing for water resource projects for the next 5 years?

Questions?