Hetch Hetchy Regional Water System

Operated by the San Francisco Public Utilities Commission

# Water Workshop Number 3
# Water Supply Planning Scenarios

**March 26, 2021**

# Introduction

- Ten water supply planning scenarios were run using our HHLSM system modeling tool and the Regional Water System Supply and Demand Worksheet.
- For each scenario the ultimate result is either a surplus or deficit of supply, and each scenario produces different results, demonstrating the effect of the choices that are made.
- The assumptions and results for each scenario will be displayed in this presentation.
- The presentation concludes with a summary table of the bottom-line results for all the scenarios.

# The Ten Scenarios

I. Previous Demand Estimates
II. Current Conditions
III. Tuolumne River Voluntary Agreement
IV. Bay-Delta Plan
V. Bay-Delta Plan with Alternative Water Supply Projects
VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy
VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought
VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought
IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows
X. NGO Scenario 2: Current system, 223 mgd constant demand, 7 ½ year design drought, Bay-Delta Plan flows

# I. Prior Demand Estimates

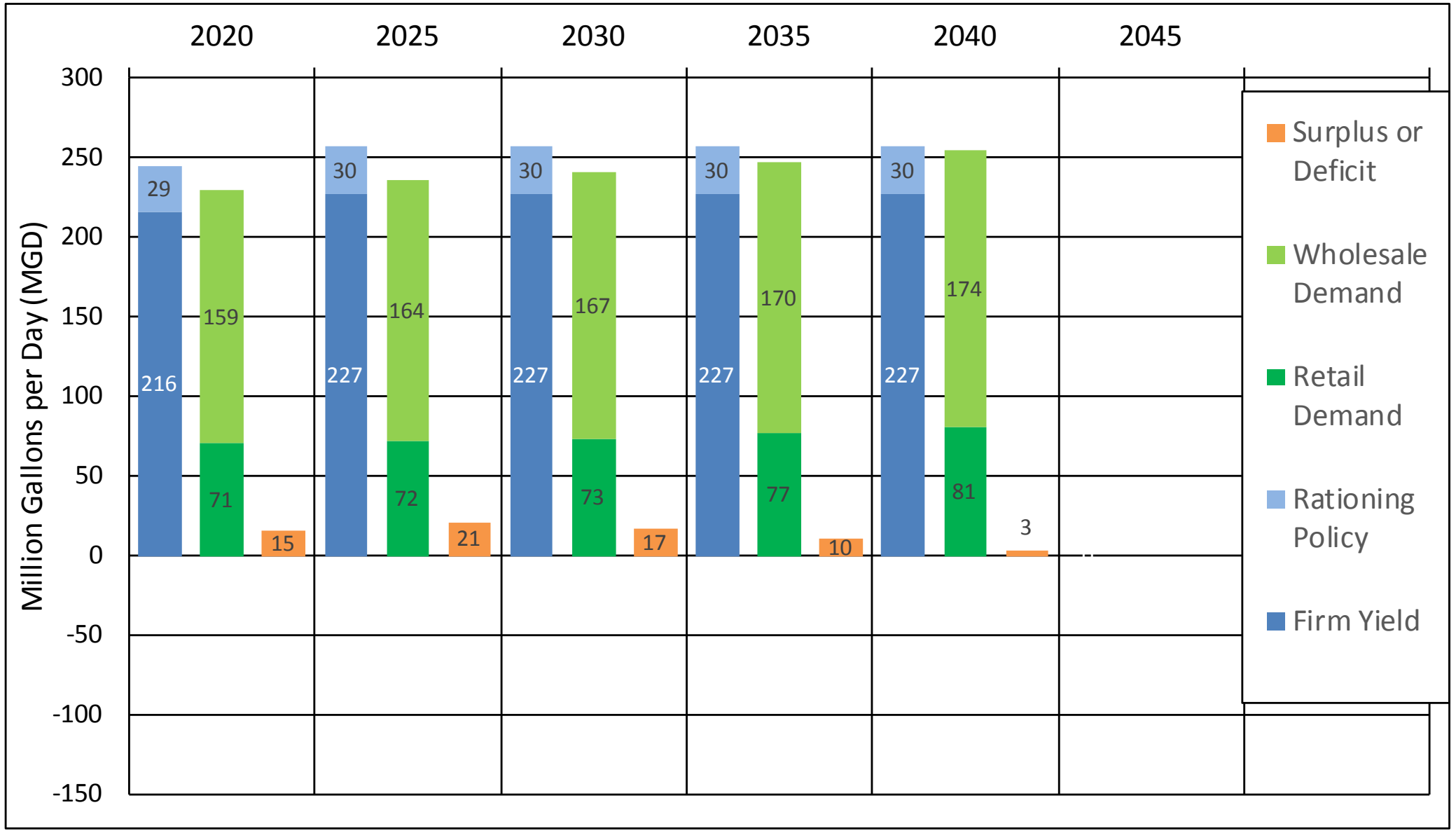
- Includes retail demand projections from the 2015 Urban Water Management Plan
- Includes 2015 purchase projections from wholesale customers
- Includes current side agreement on flows in the lower Tuolumne River
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 245 | 257 | 257 | 257 | 257 | NA |
| RWS Demand: | 230 | 236 | 241 | 247 | 255 | NA |
| Lower Tuolumne Contribution: | NA | NA | NA | NA | NA | NA |
| Surplus or Deficit: | 15 | 21 | 17 | 10 | 3 | NA |

Hetch Hetchy Regional Water System

# I. Prior Demand Estimates



# II. Current Conditions

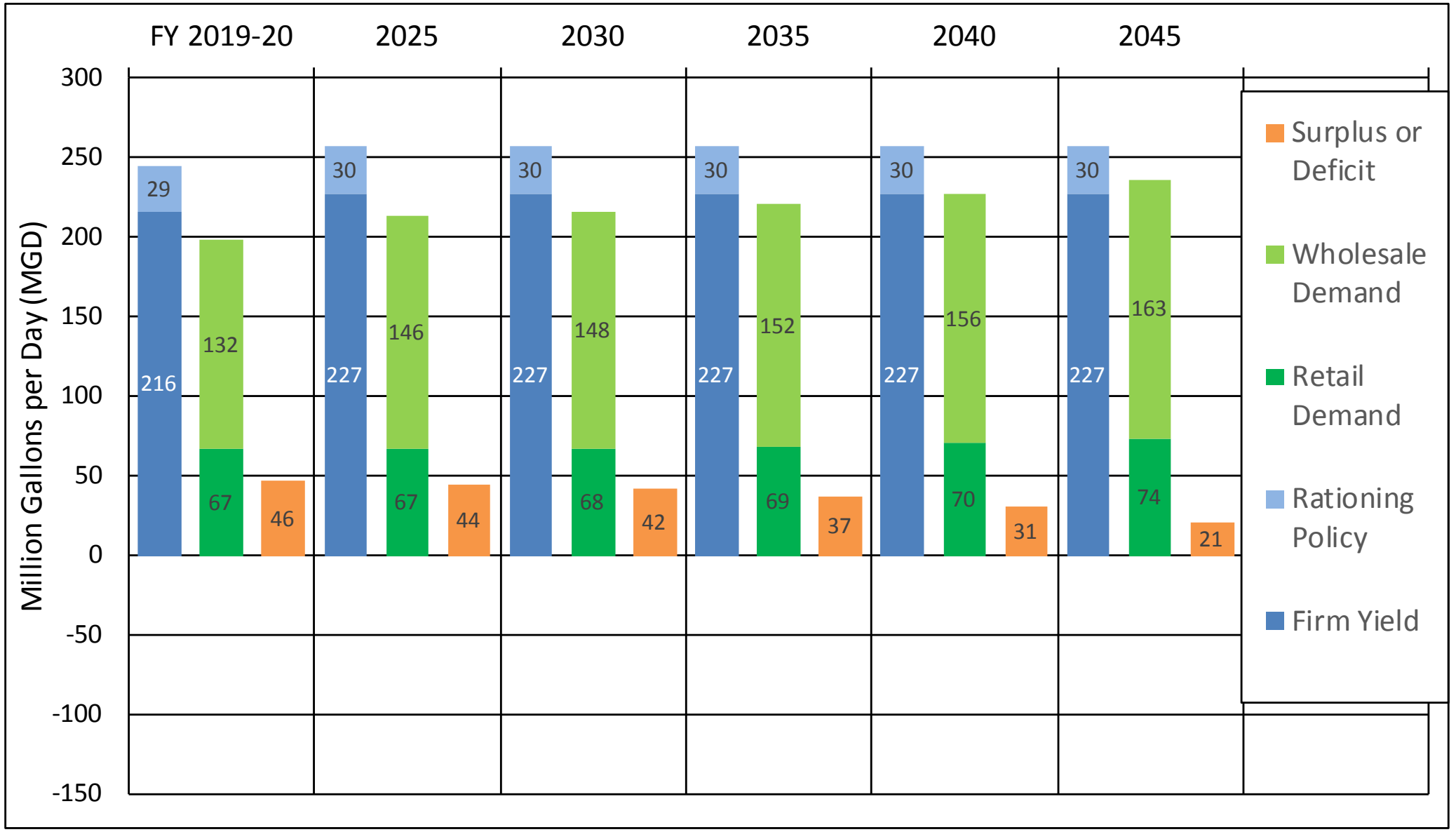
- Includes updated demand projections for anticipated development in retail service area*
- Includes most recent purchase projections from wholesale customers*
- Includes a total of 9 MGD for San Jose and Santa Clara*
- Includes the 1995 side agreement on flows in the lower Tuolumne River
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 245 | 257 | 257 | 257 | 257 | 257 |
| RWS Demand: | 198 | 213 | 215 | 220 | 227 | 236 |
| Lower Tuolumne Contribution: | NA | NA | NA | NA | NA | NA |
| Surplus or Deficit: | 46 | 44 | 42 | 37 | 31 | 21 |

* Base Conditions in later slides

# II. Current Conditions



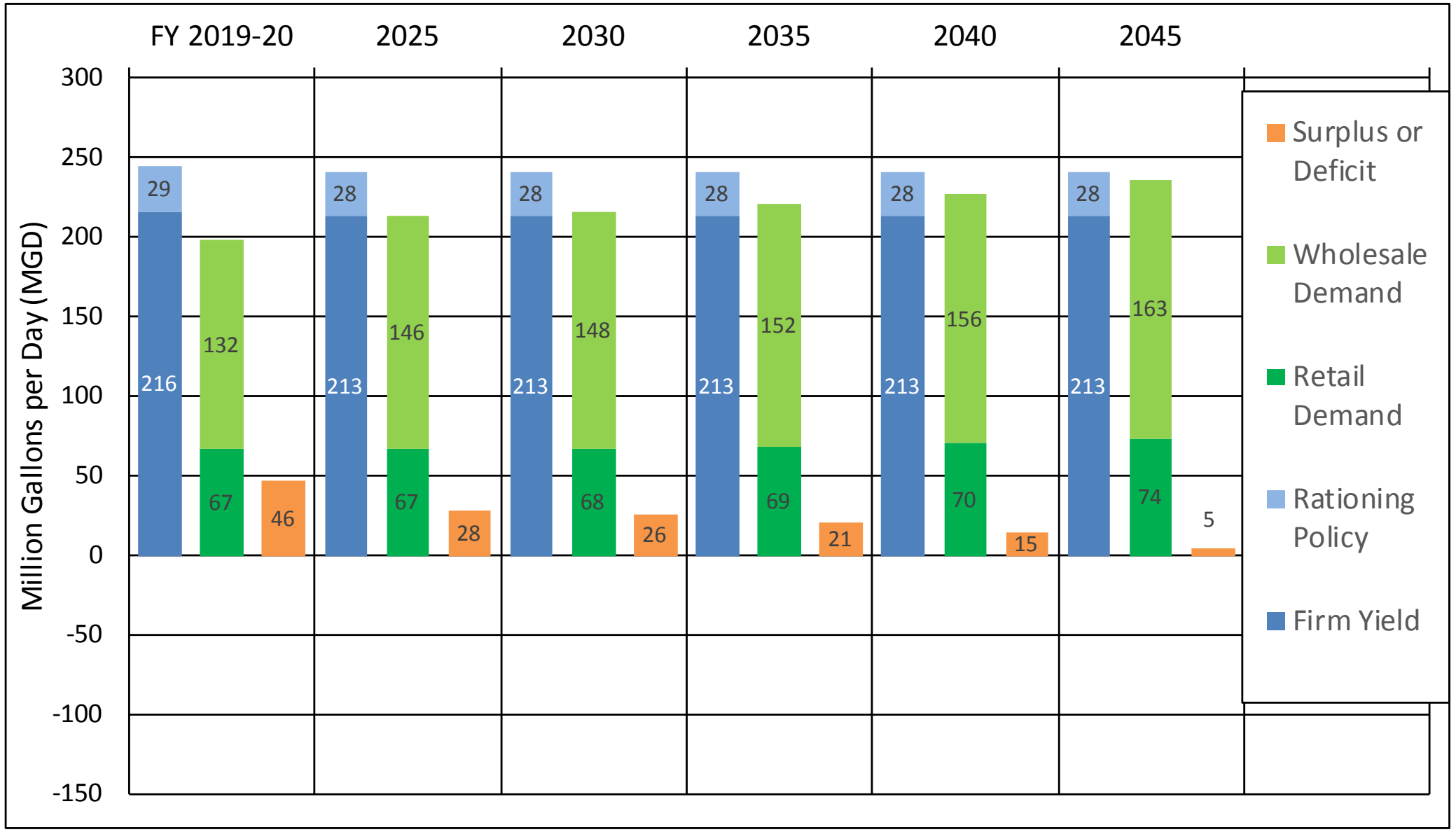
# III. Tuolumne River Voluntary Agreement

- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the TRVA, displayed in the graph as a reduction in Firm Yield
- SFPUC contributions are calculated according to the 4th Agreement and assumes continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 245 | 241 | 241 | 241 | 241 | 241 |
| RWS Demand: | 198 | 213 | 215 | 220 | 227 | 236 |
| Lower Tuolumne Contribution: | NA | 14 | 14 | 14 | 14 | 14 |
| Surplus or Deficit: | 46 | 28 | 26 | 21 | 15 | 5 |

# III. Tuolumne River Voluntary Agreement



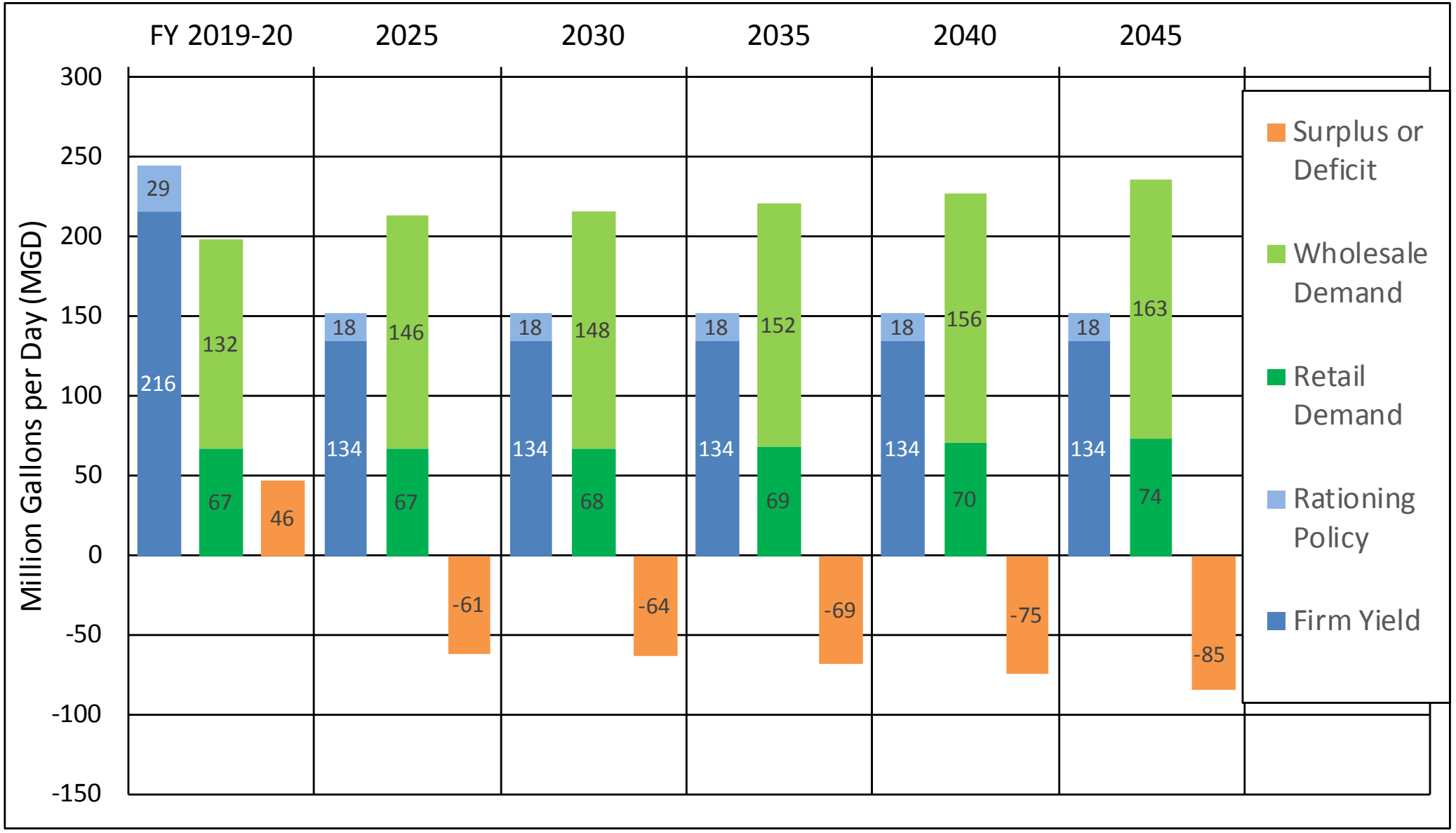
# IV. Bay-Delta Plan

- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 245 | 152 | 152 | 152 | 152 | 152 |
| RWS Demand: | 198 | 213 | 215 | 220 | 227 | 236 |
| Lower Tuolumne Contribution: | NA | 93 | 93 | 93 | 93 | 93 |
| Surplus or Deficit: | 46 | -61 | -64 | -69 | -75 | -85 |

# IV. Bay-Delta Plan



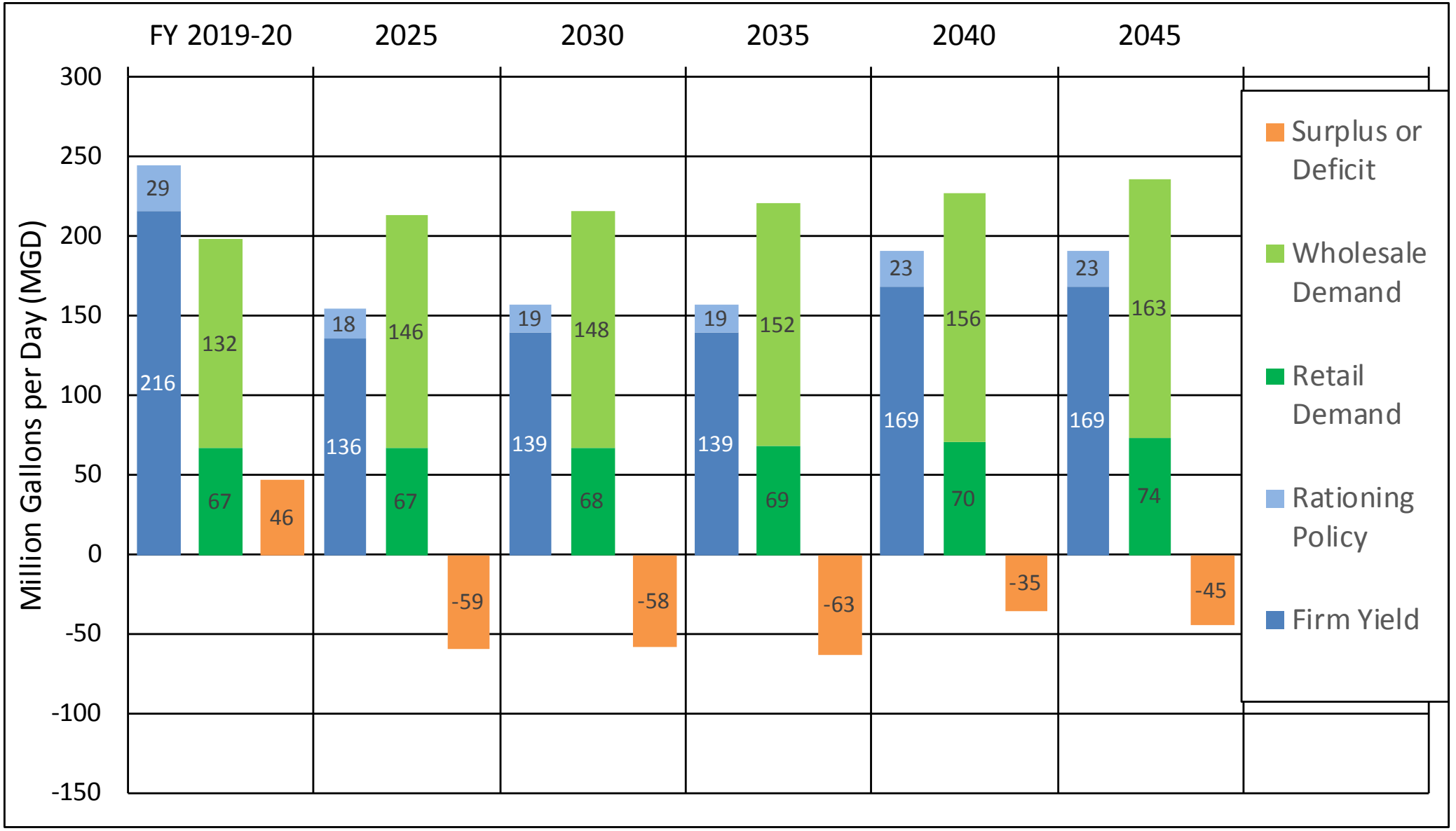
# V. Bay-Delta Plan with Alternative Water Supply Projects

- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, which are assumed to be added between 2025 and 2040. The firm yield from the new projects is shown separately in the table to demonstrate the estimated development of the projects over time. The new project yield is also included in the Total Yield shown in the table.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 245 | 154 | 158 | 158 | 192 | 192 |
| RWS Demand: | 198 | 213 | 215 | 220 | 227 | 236 |
| Lower Tuolumne Contribution: | NA | 93 | 93 | 93 | 93 | 93 |
| Alternative Water Supply Projects: | NA | 2 | 5 | 5 | 35 | 35 |
| Surplus or Deficit: | 46 | -59 | -58 | -63 | -35 | -45 |

# V. Bay-Delta Plan with Alternative Water Supply Projects



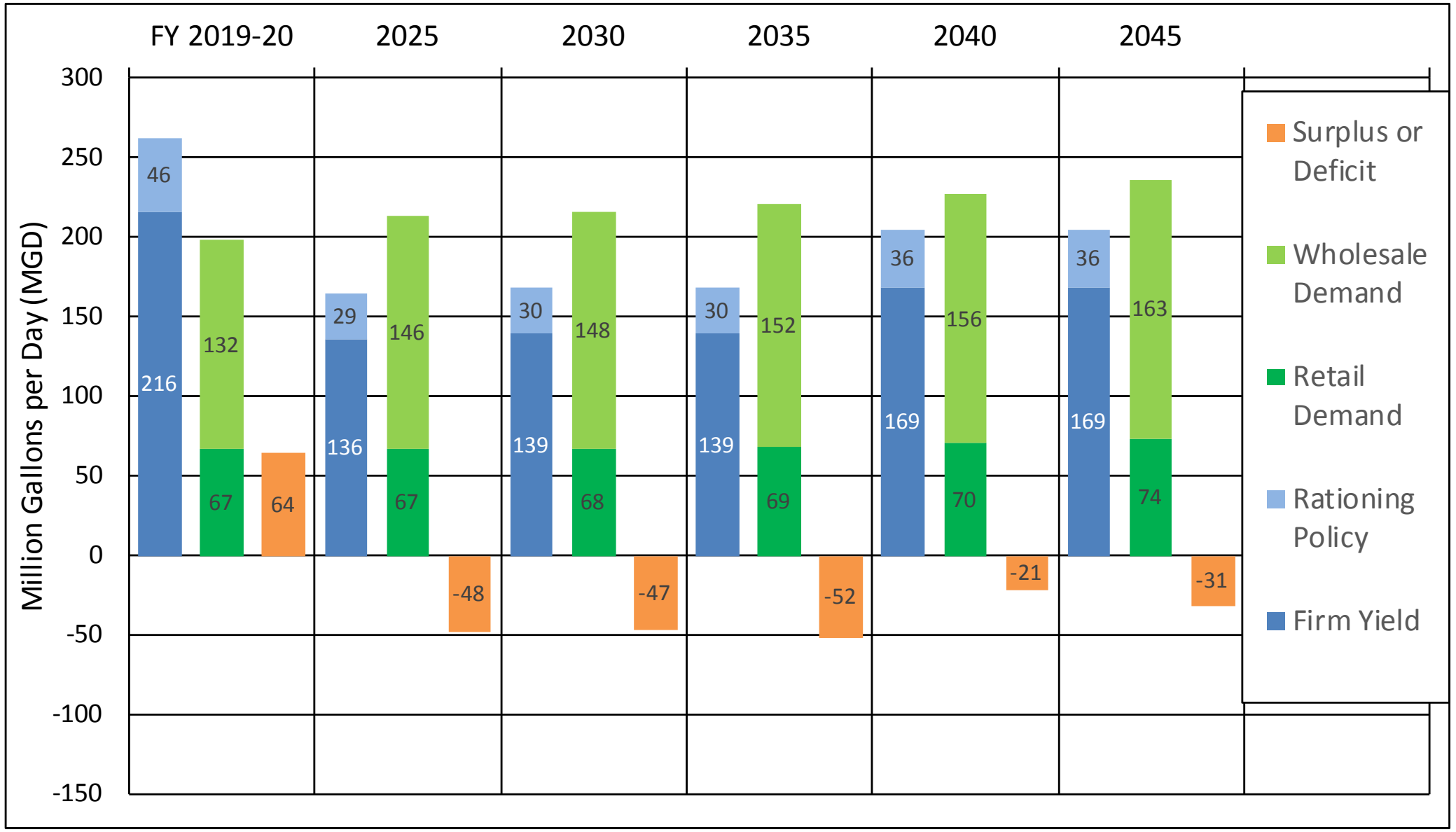
# VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy

- Base Conditions
- Yield values are based on the 8.5-year design drought
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Includes 7.5 years of rationing at 20% in the 8.5-year design drought sequence

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 262 | 165 | 169 | 169 | 205 | 205 |
| RWS Demand: | 198 | 213 | 215 | 220 | 227 | 236 |
| Lower Tuolumne Contribution: | NA | 93 | 93 | 93 | 93 | 93 |
| Surplus or Deficit: | 64 | -48 | -47 | -52 | -21 | -31 |

# VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy



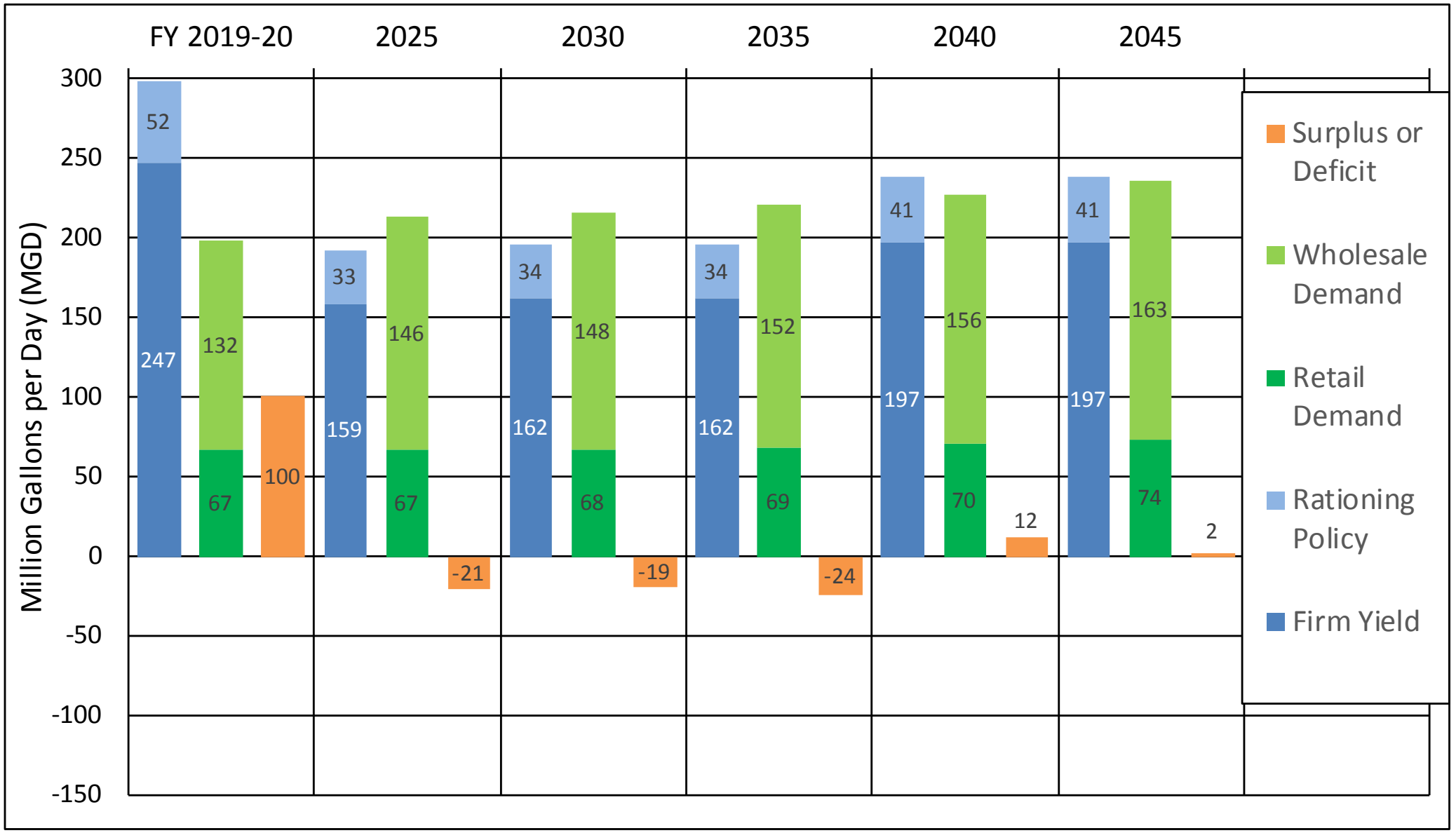
# VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought

- Base Conditions
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Yield values are estimated using a 7.5-year design drought
- Includes 6.5 years of rationing at 20% in the 7.5-year design drought sequence.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 299 | 192 | 196 | 196 | 238 | 238 |
| RWS Demand: | 198 | 213 | 215 | 220 | 227 | 236 |
| Lower Tuolumne Contribution: | NA | 101 | 101 | 101 | 101 | 101 |
| Surplus or Deficit: | 100 | -21 | -19 | -24 | 12 | 2 |

# VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought



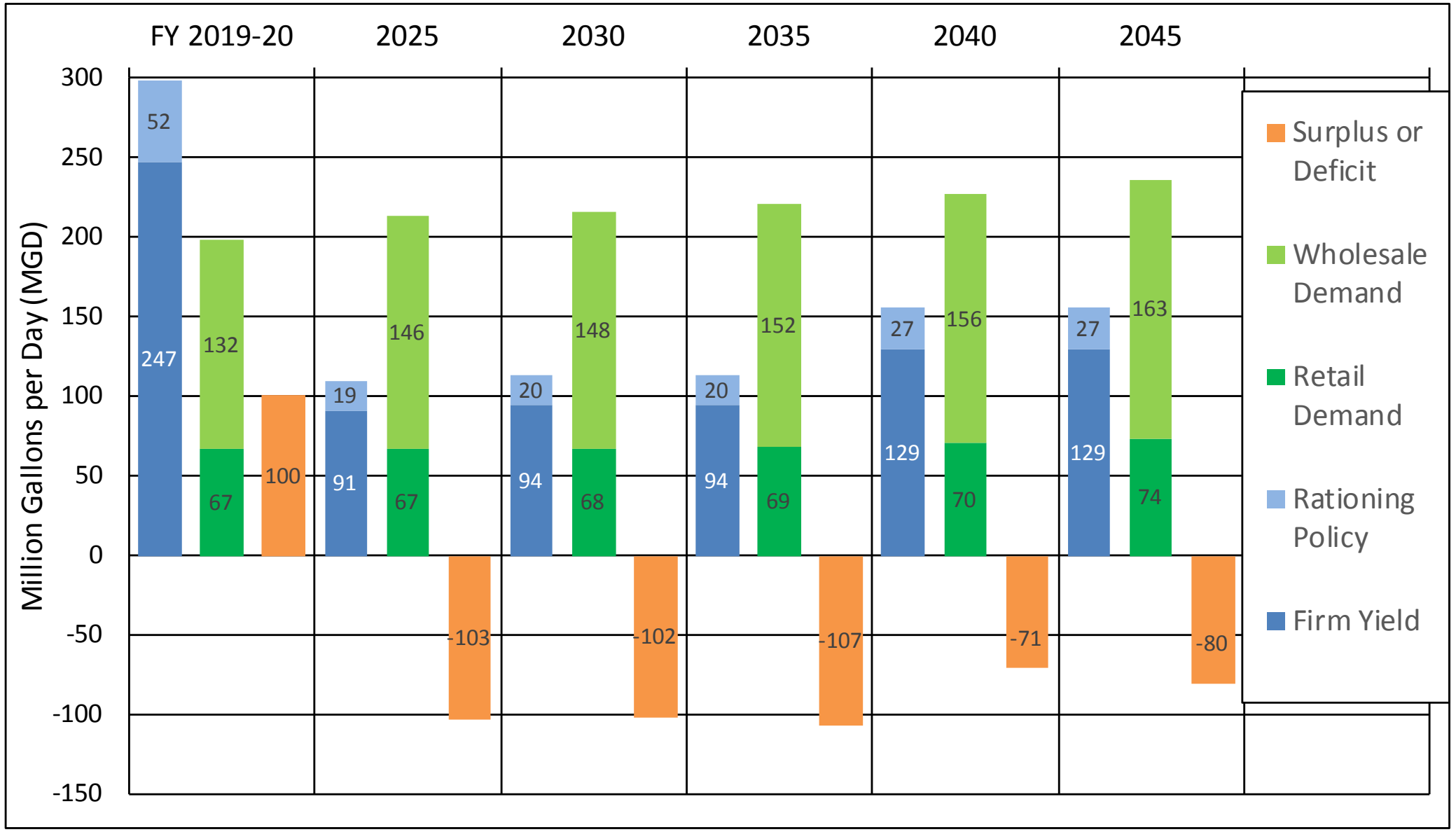
# VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought

- Base Conditions
- Includes SFPUC contribution to the Section 401 water quality certification on the FERC license displayed in the graph as a reduction in Firm Yield.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Yield values are estimated using a 7.5-year design drought
- Includes 6.5 years of rationing at 20% in the 7.5-year design drought sequence.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 299 | 110 | 114 | 114 | 156 | 156 |
| RWS Demand: | 198 | 213 | 215 | 220 | 227 | 236 |
| Lower Tuolumne Contribution: | NA | 169 | 169 | 169 | 169 | 169 |
| Surplus or Deficit: | 100 | -103 | -102 | -107 | -71 | -80 |

# VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought



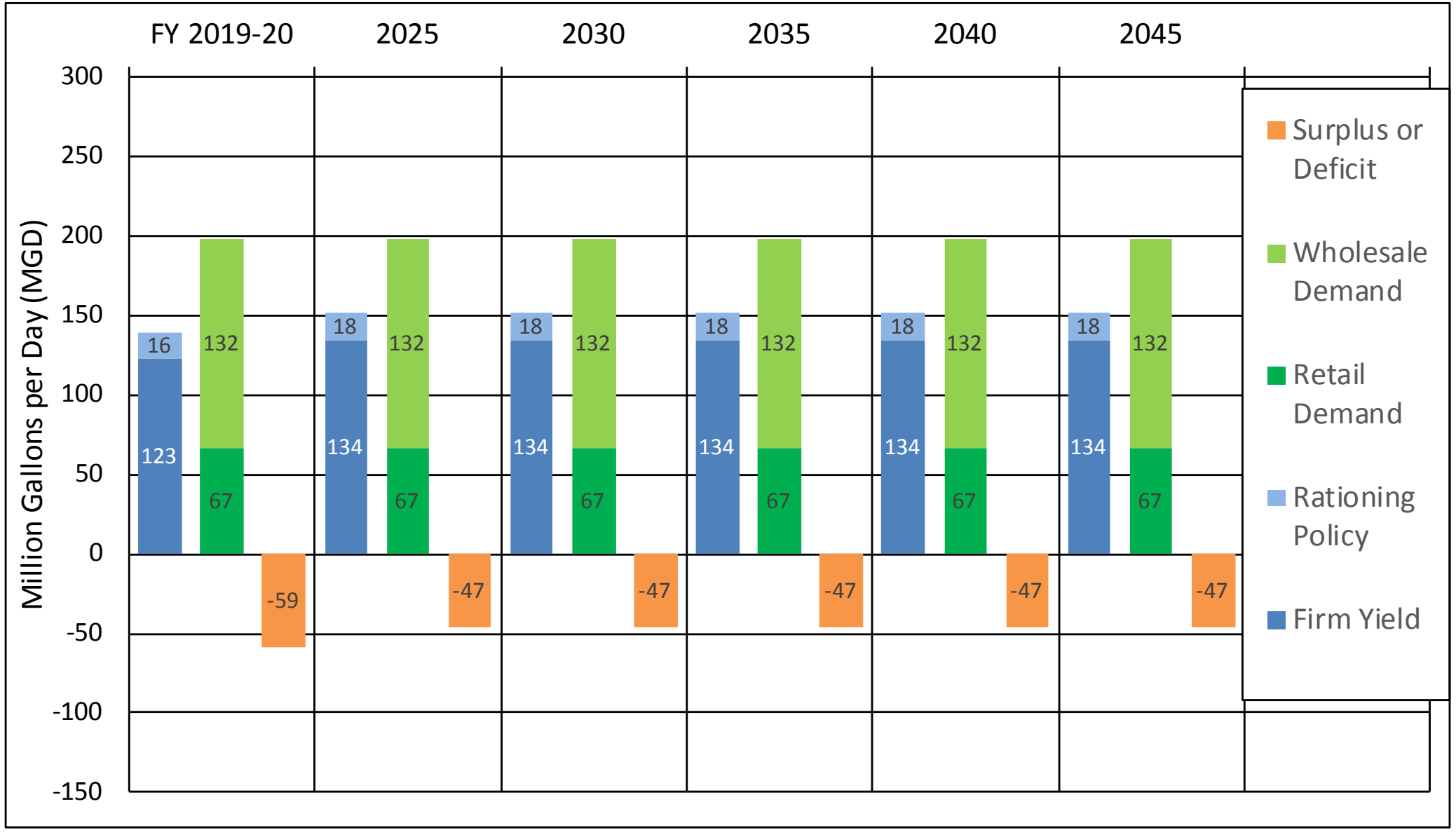
# IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows

- Assumes that retail and wholesale demand on the RWS remain at the current level of approximately 198 MGD, and that SFPUC contributions to the Bay-Delta Plan are being made now
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 139 | 152 | 152 | 152 | 152 | 152 |
| RWS Demand: | 198 | 198 | 198 | 198 | 198 | 198 |
| Lower Tuolumne Contribution: | 93 | 93 | 93 | 93 | 93 | 93 |
| Surplus or Deficit: | -59 | -47 | -47 | -47 | -47 | -47 |

# IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows



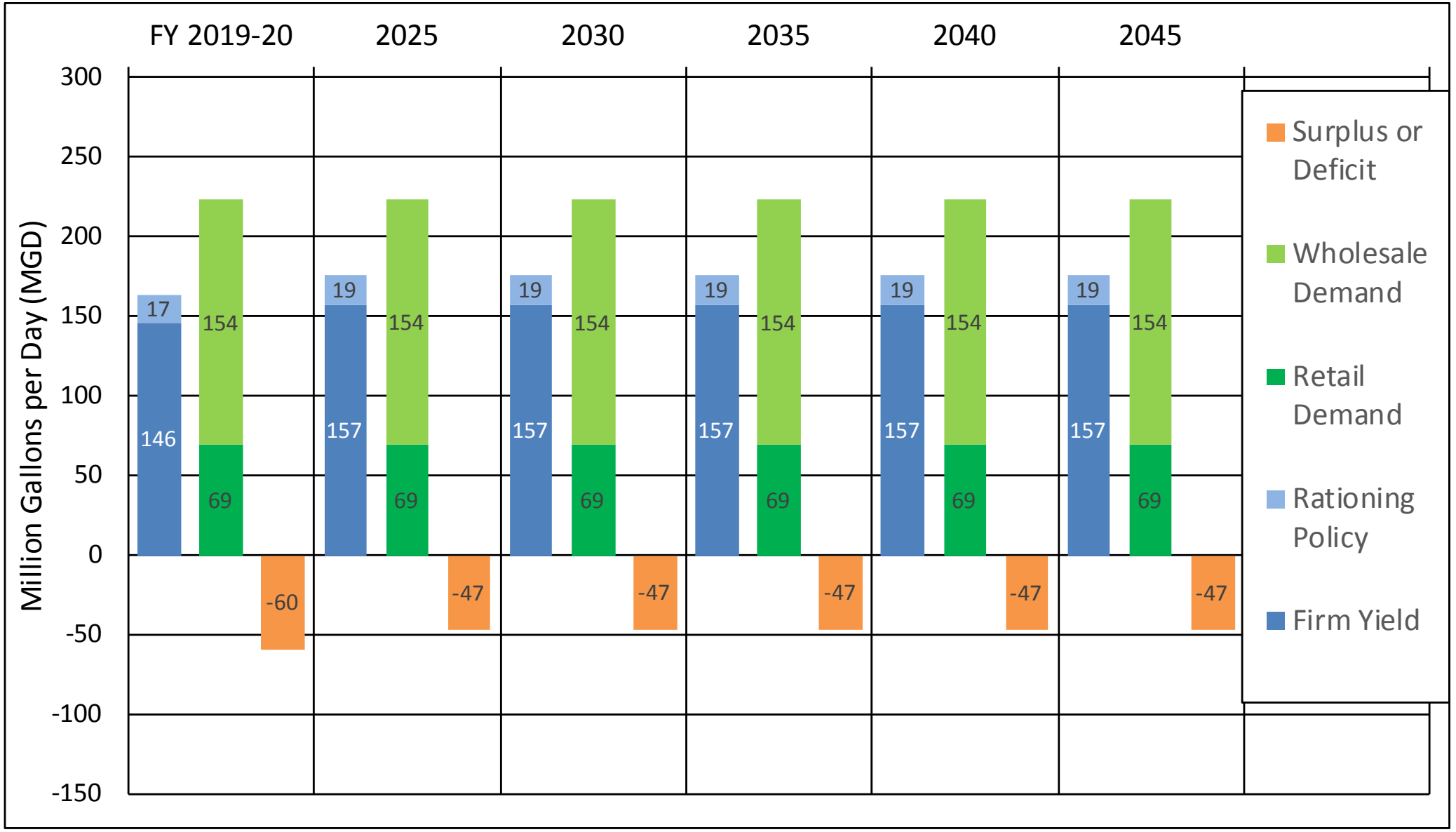
# X. NGO scenario 2: Current system, 223 mgd constant demand, 7½ year design drought, Bay-Delta Plan flows

- Includes an assumed demand of 223 MGD for the SFPUC service area in all years
- Includes a total of 9 MGD for San Jose and Santa Clara
- Includes SFPUC contribution to the Bay-Delta Plan, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year. Assumes this contribution begins now.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Yield values are estimated using a 7.5-year design drought and a truncated version of the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

| | FY 2019-20 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Total Yield: | 163 | 176 | 176 | 176 | 176 | 176 |
| RWS Demand: | 223 | 223 | 223 | 223 | 223 | 223 |
| Lower Tuolumne Contribution: | 101 | 101 | 101 | 101 | 101 | 101 |
| Surplus or Deficit: | -59 | -47 | -47 | -47 | -47 | -47 |

# X. NGO scenario 2: Current system, 223 mgd constant demand, 7½ year design drought, Bay-Delta Plan flows



| SCENARIO SURPLUSES OR DEFICITS | | | | | | |
|---|---|---|---|---|---|---|
| **SCENARIOS** | **FY19-20** | **2025** | **2030** | **2035** | **2040** | **2045** |
| **I.** Previous Demand Estimates | 15 | 21 | 17 | 10 | 3 | NA |
| **II.** Current Conditions | 46 | 44 | 42 | 37 | 31 | 21 |
| **III.** Tuolumne River Voluntary Agreement | 46 | 28 | 26 | 21 | 15 | 5 |
| **IV.** Bay-Delta Plan | 46 | -61 | -64 | -69 | -75 | -85 |
| **V.** Bay-Delta Plan with Alternative Water Supply Projects | 46 | -59 | -58 | -63 | -35 | -45 |
| **VI.** Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy | 64 | -48 | -47 | -52 | -21 | -31 |
| **VII.** Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design | 100 | -21 | -19 | -24 | 12 | 2 |
| **VIII.** Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought | 100 | -103 | -102 | -107 | -71 | -80 |
| **IX.** NGO scenario 1: Current system and 198 mgd constant demand and Bay-Delta Plan flows | -59 | -47 | -47 | -47 | -47 | -47 |
| **X.** NGO Scenario 2: Current system, 223 mgd constant demand, 7 ½ year design drought and Bay-Delta Plan | -60 | -47 | -47 | -47 | -47 | -47 |