MARIN WATER

Strategic Water Supply Assessment

Board of Directors Working Session II

May 10, 2022

Water Supply Assessment: Overview

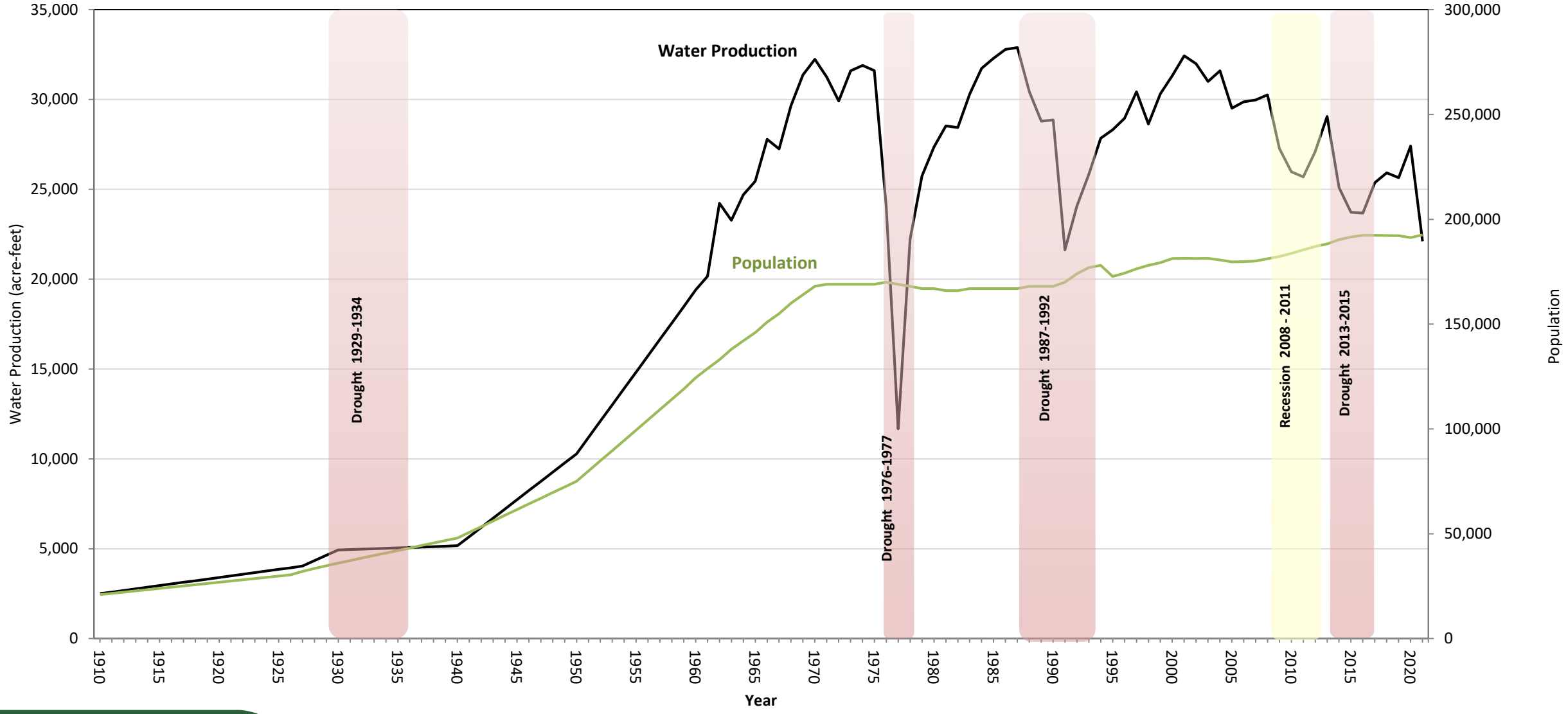
- Review of System Demand
- Demands by Sector
- Recent Trends in Demand
- Opportunity for Demand Savings
- Scenarios
- Summary and Next Steps

Water Supply Assessment: Common Terms/Definitions

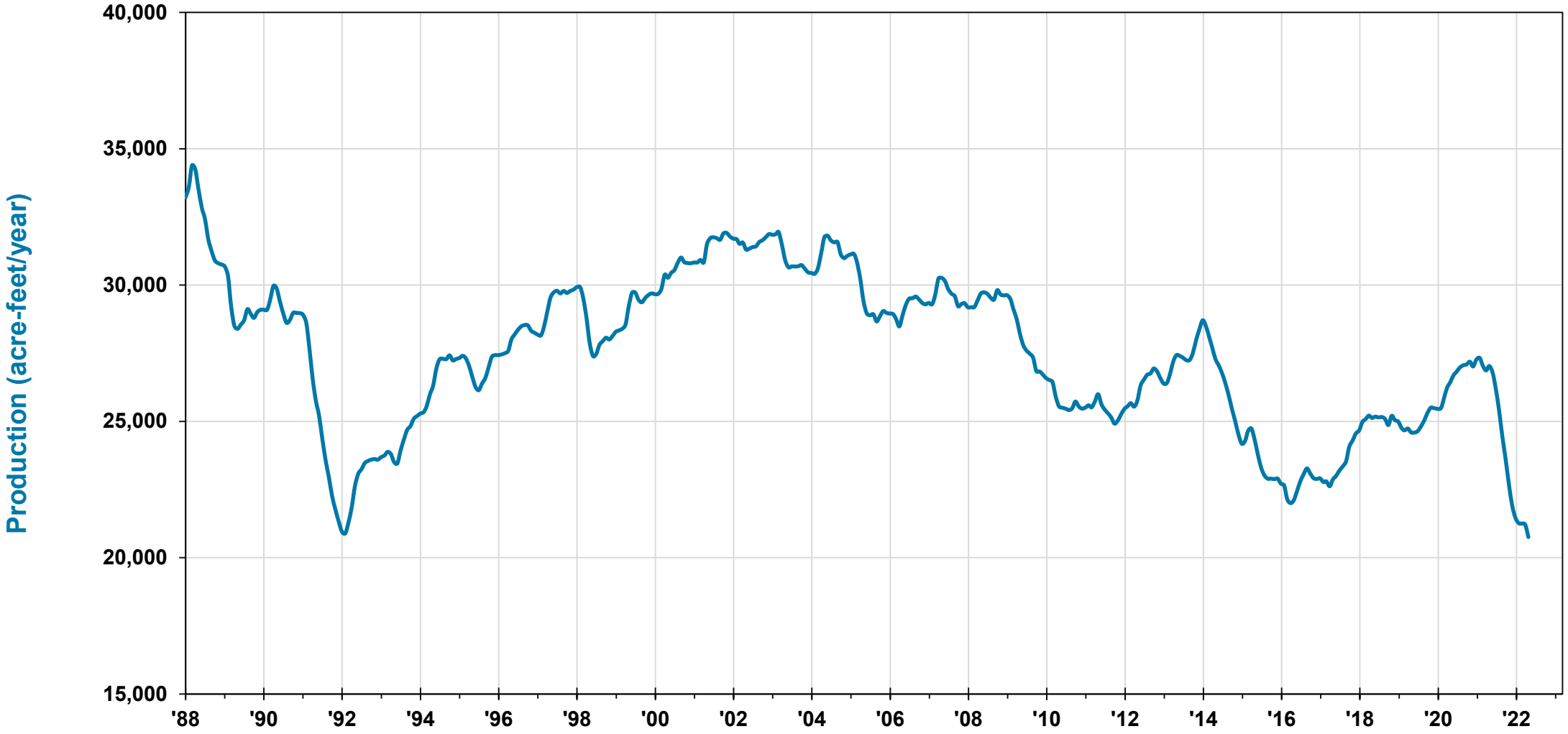
- District GPCD – total water use divided by total population
- Residential GPCD or R-GPCD – total water use by residential customers divided by the total population
- Gallons per household per day – GPHD water used by a single service or household in one day
- Acre foot – the amount of water need to cover 1 acre to a depth of 1 foot or approximately 325,850 gallons
- Acre-feet per year – AFY

System Demands

Water Supply Assessment: Water Production and Population



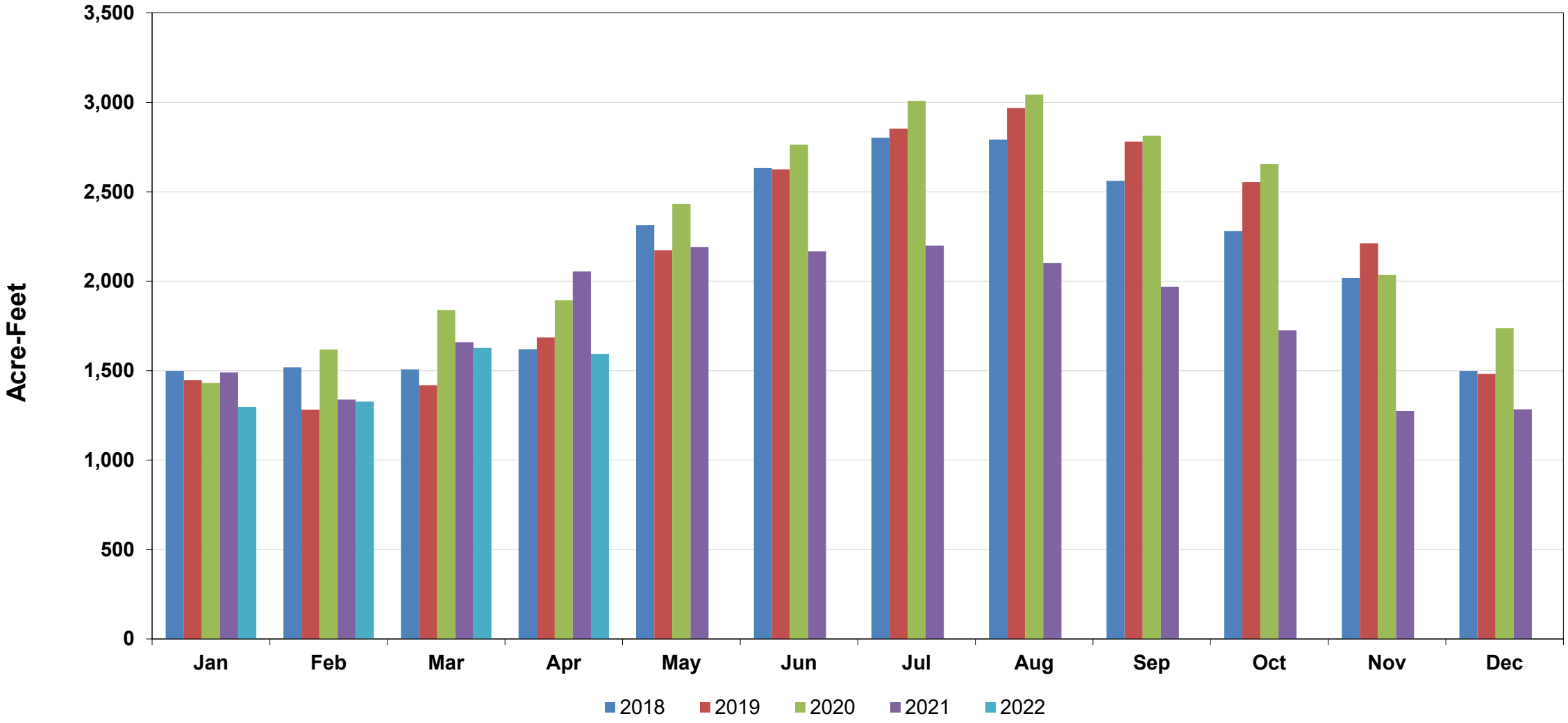
Water Supply Assessment: Running 12 Month Production



Water Supply Assessment: Baseline Annual Demands

	Acre-Feet (AF)
Production	25,800
Environmental Releases	11,000
Evaporation from Reservoirs	4,500
Total	41,300

Water Supply Assessment: Monthly Water Production



Water Supply Assessment: Historical Demand By Sector

Use Type	Annual Consumption (AFY)				
	2016	2017	2018	2019	2020
Single Family	12,419	13,337	13,886	13,579	15,287
Multi-Family	2,946	3,004	3,065	3,063	3,311
Commercial (Business/Industrial)	2,583	2,628	2,671	2,634	2,282
Institutional/Governmental	1,295	1,374	1,365	1,386	1,323
Landscape	1,248	1,369	1,417	1,348	1,525
Other (incl. Non-Revenue Water) (a)	2,154	2,846	2,674	2,851	2,794
Total	22,644	24,557	25,077	24,863	26,523

Abbreviations:

AFY = acre-foot per year

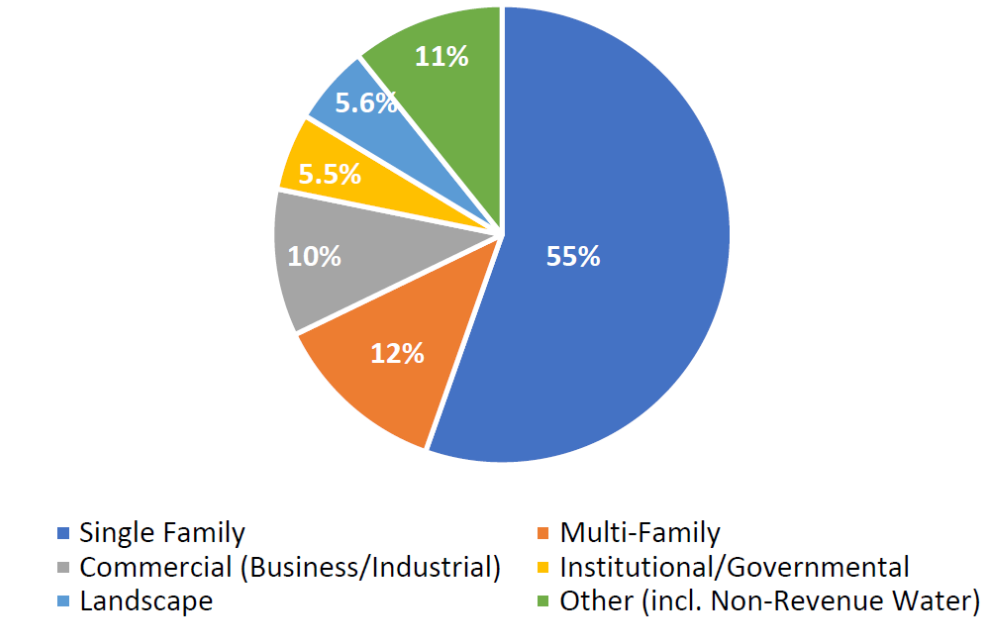
Notes:

(a) Other includes water losses, other non-revenue water, and fireline/hydrant water use (MMWD, 2021).

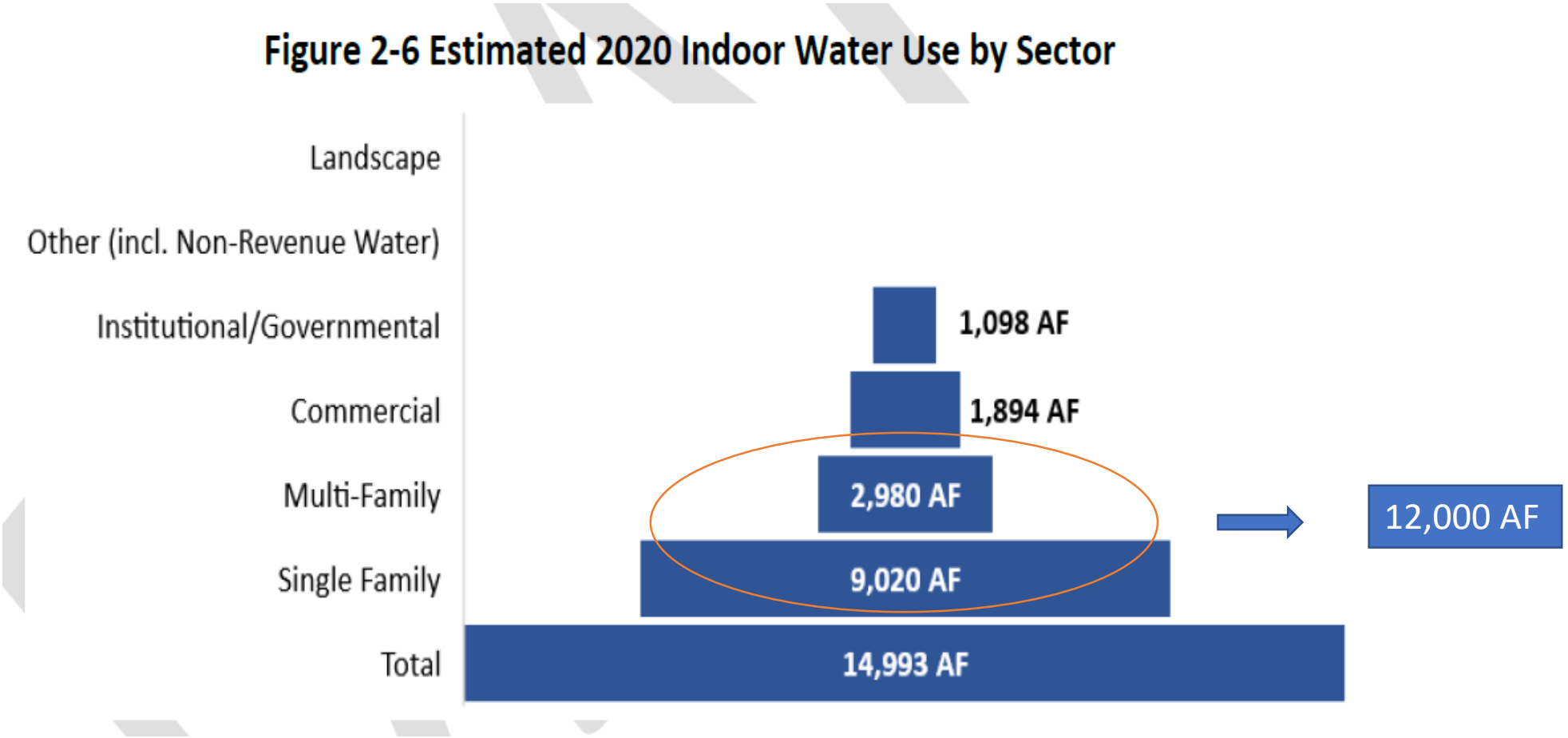
Water Supply Assessment: Potable Demand by Sector: Average Breakdown

Sector	5-year Average (2016-2020)	
Single-family	13,702	55%
Multi-family	3,078	12%
Landscape	1,381	5.6%
Commercial	2,560	10%
Institutional	1,349	5.5%
Other	2,664	11%
Total	24,733	

Figure 2-3 Percentage of Total Water Demand by Sector: 2016-2020

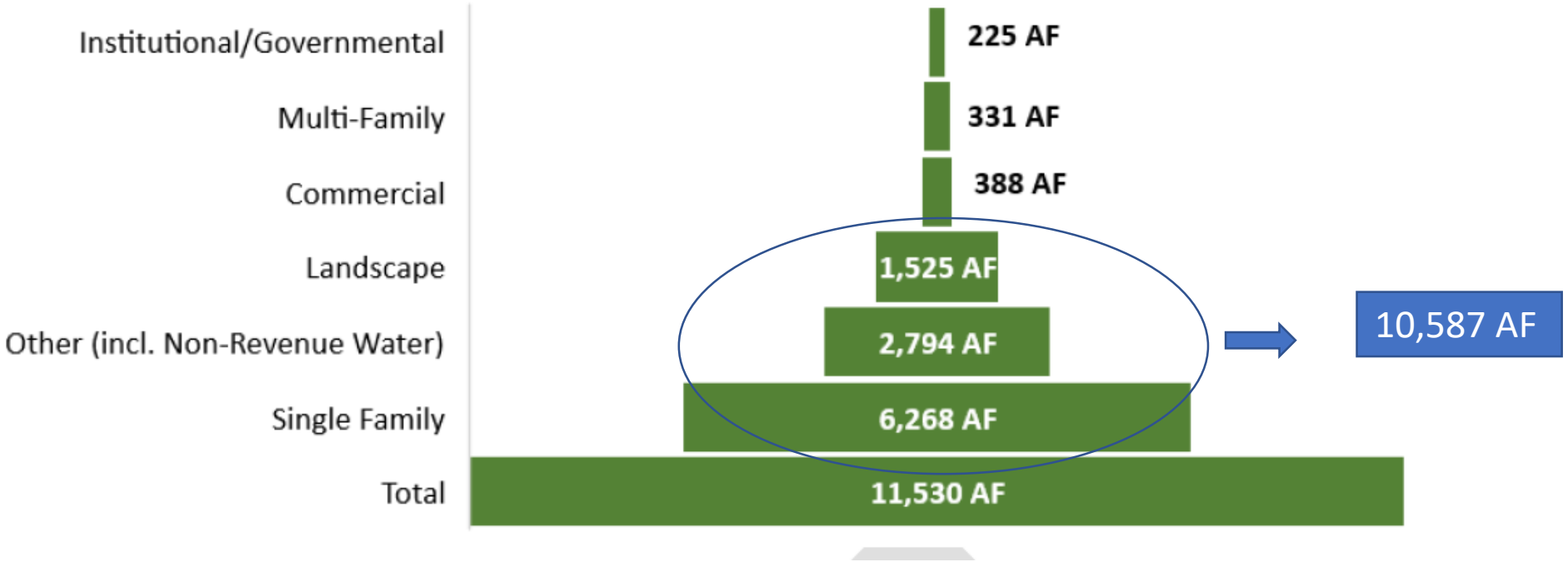


Water Supply Assessment: Historical Estimated Indoor Water use by Sector



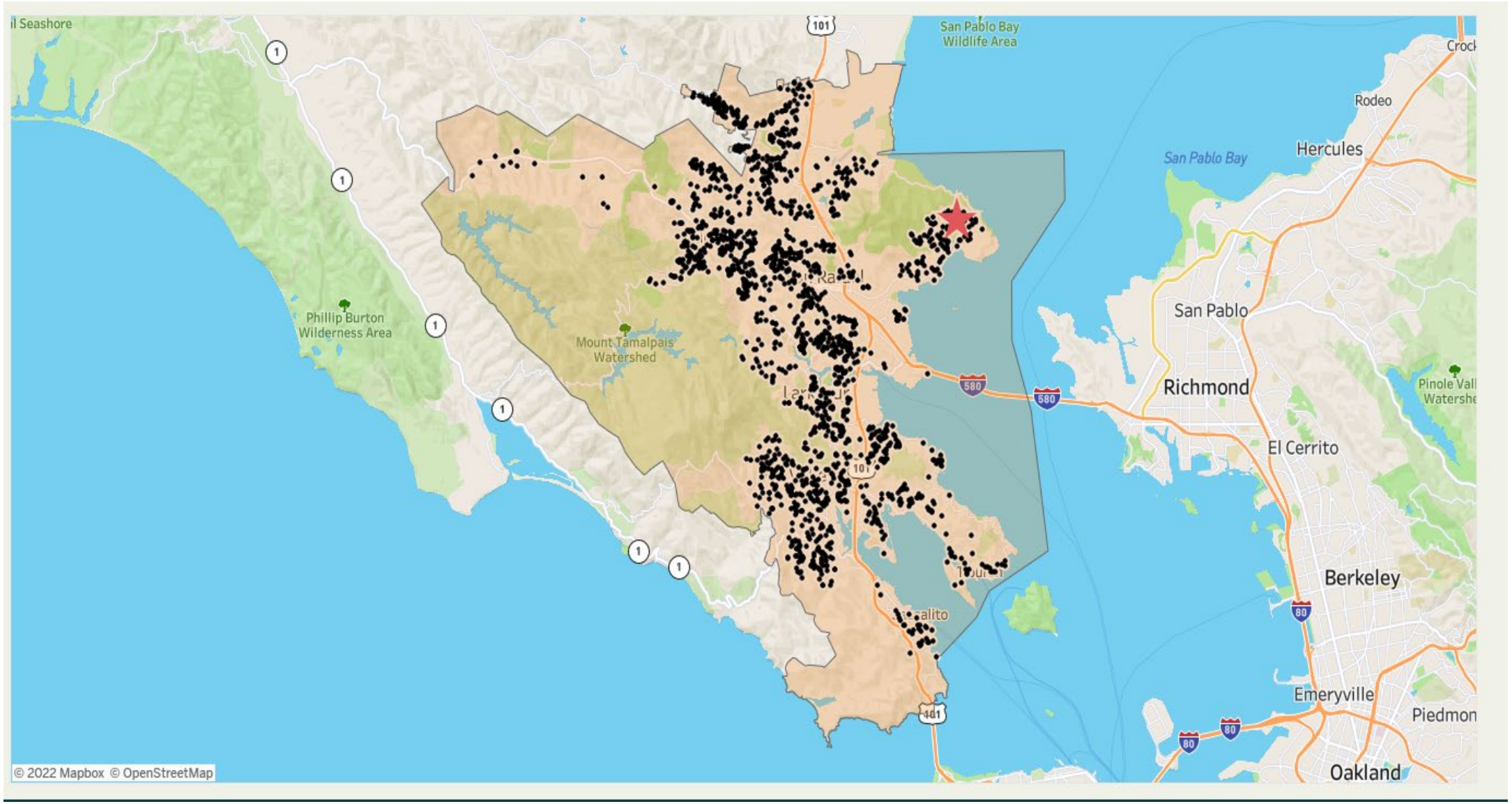
Water Supply Assessment: Historical Estimated Outdoor Water use by Sector

Figure 2-7 Estimated 2020 Outdoor Water Use by Sector

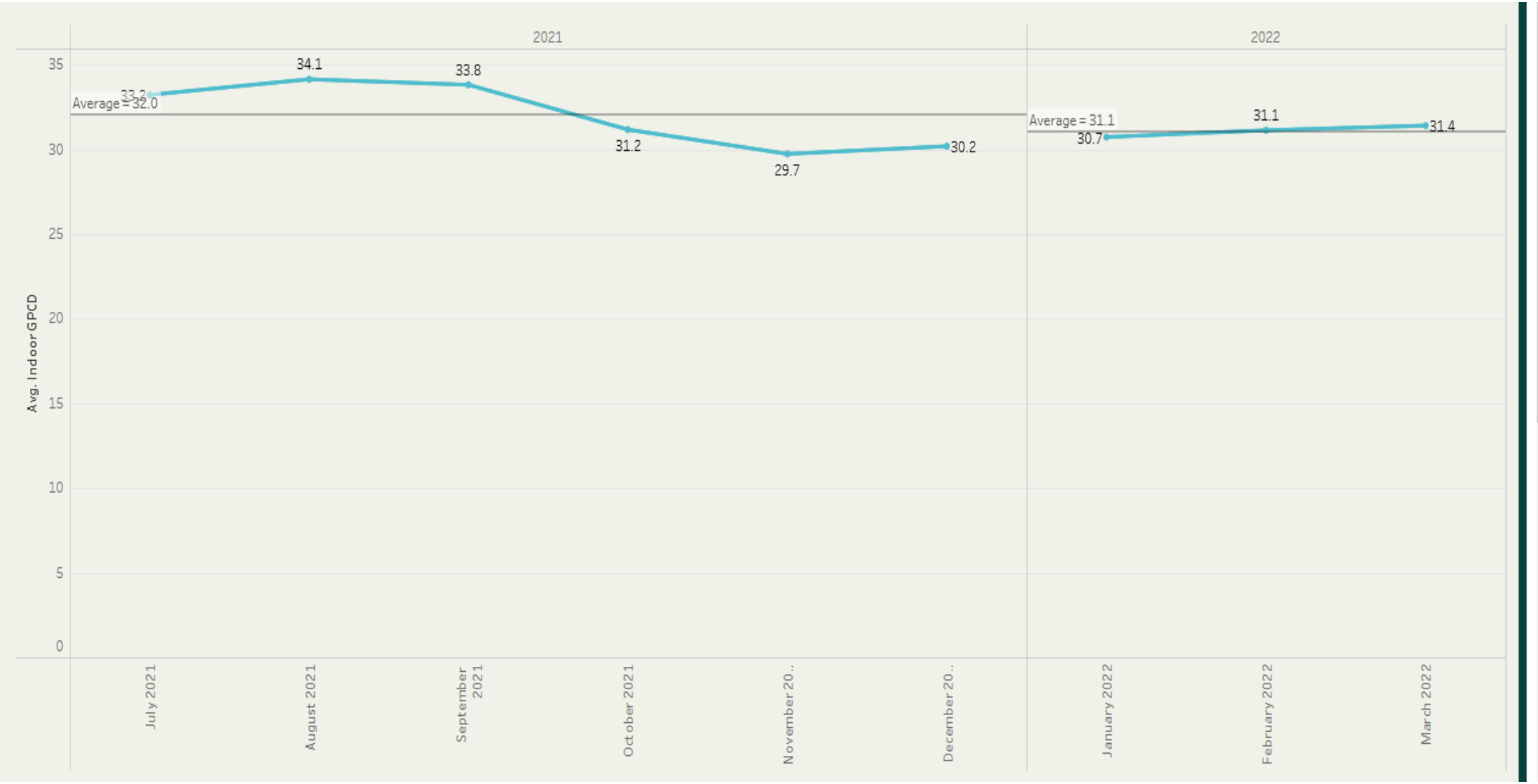


Recent Trends in Demand

Water Supply Assessment: Current Demand



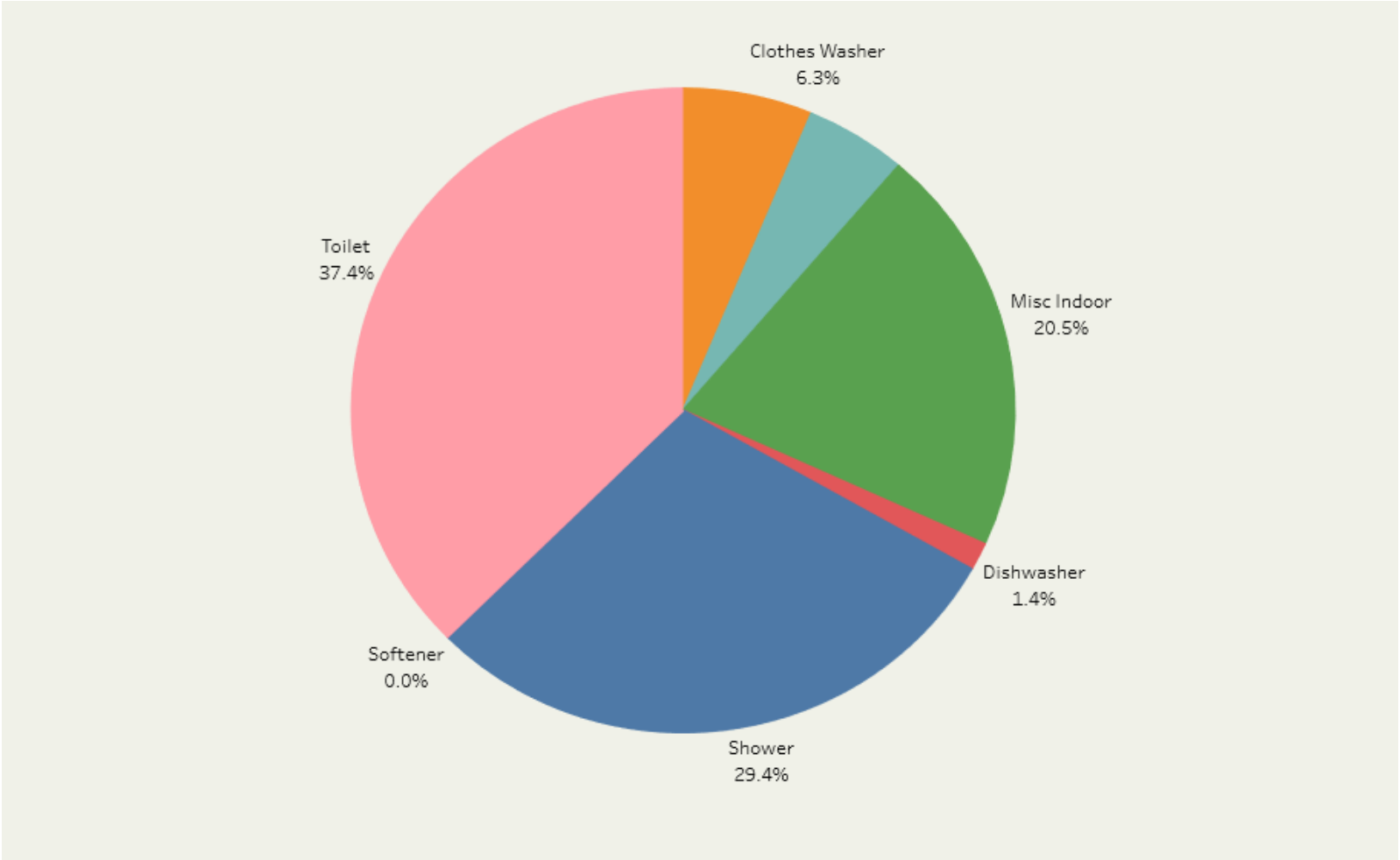
Water Supply Assessment: Residential Indoor GPCD



Water Supply Assessment: Residential Indoor GPCD Range

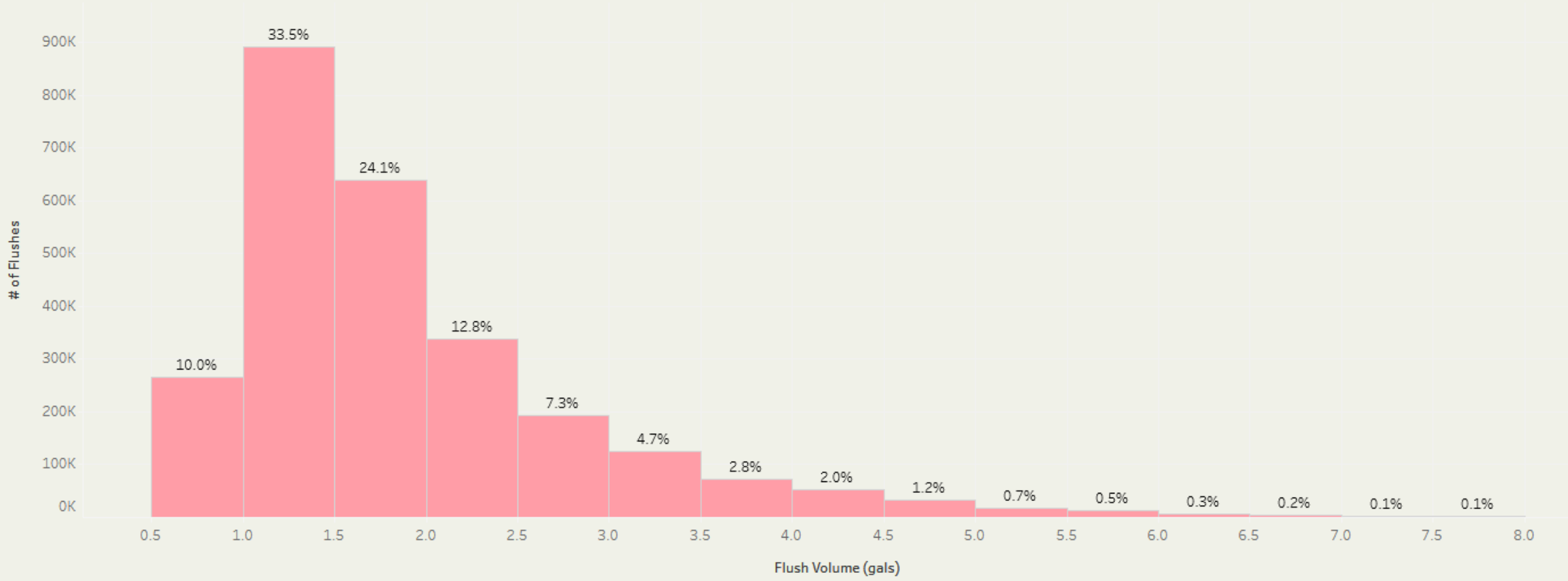
Water Supply Assessment: End Use Survey

- Majority of toilets are low flow
- Showers are relatively short in duration and limited room for savings



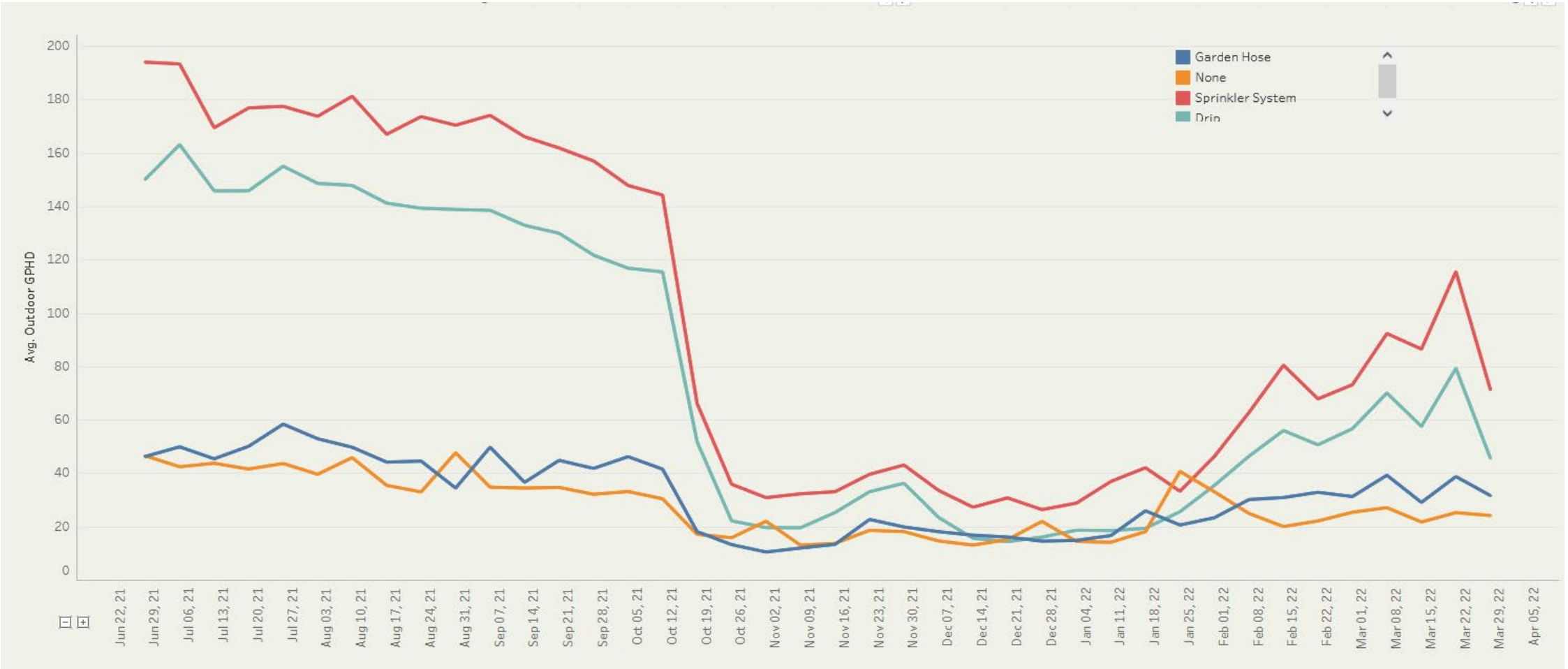
Water Supply Assessment: End Use Survey – Toilet Flushing

Avg. Flow Rate (GPM)	Median Flow Rate (GPM)	Avg. Volume (gals)	Median Volume (gals)	Total Volume (gals)	Avg. Duration (min)	Median Duration (min)	Number of Households	Number of Events
2.4	2.2	1.9	1.6	5,060,006	0.9	0.8	2,138	2,658,878

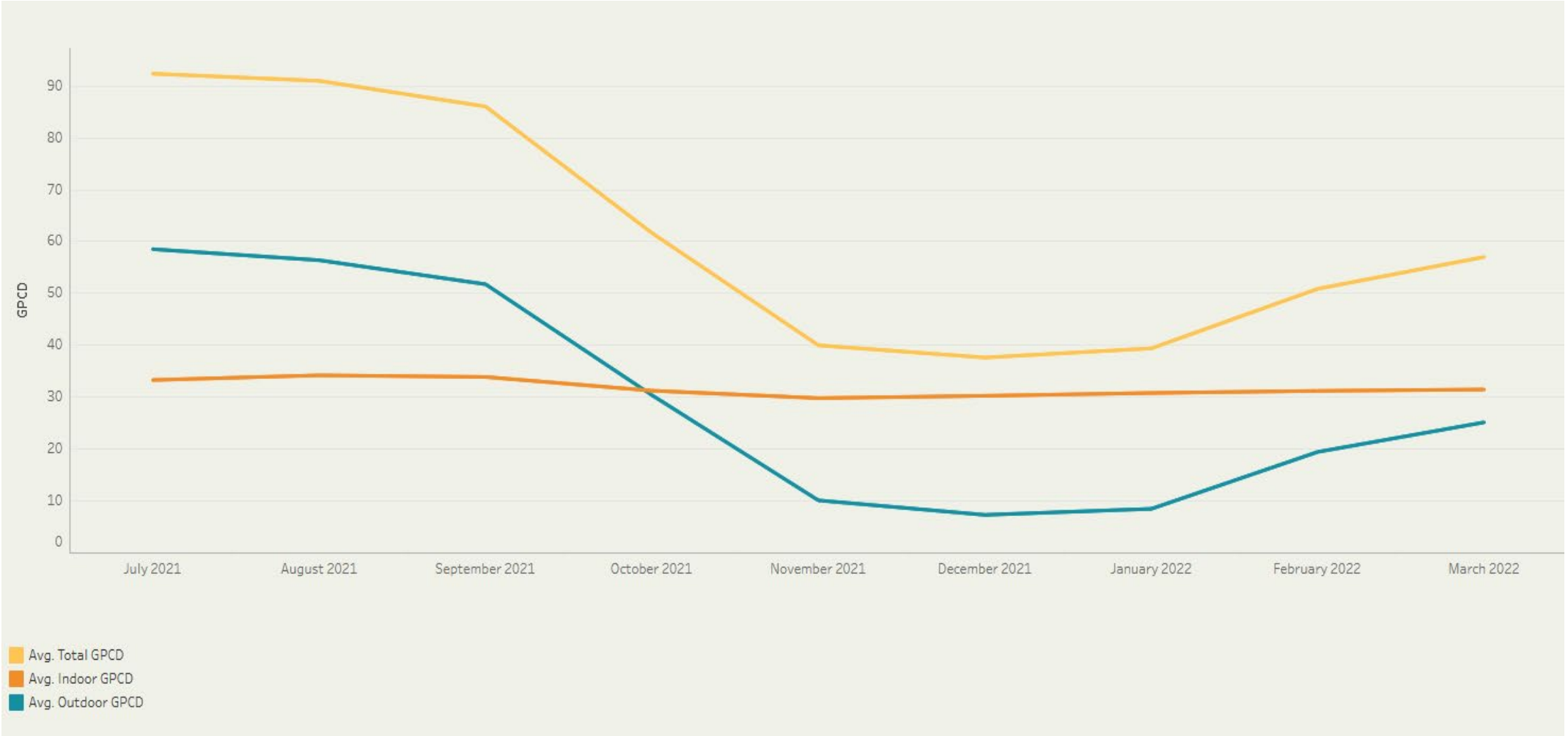


Water Supply Assessment: Residential Outdoor Usage

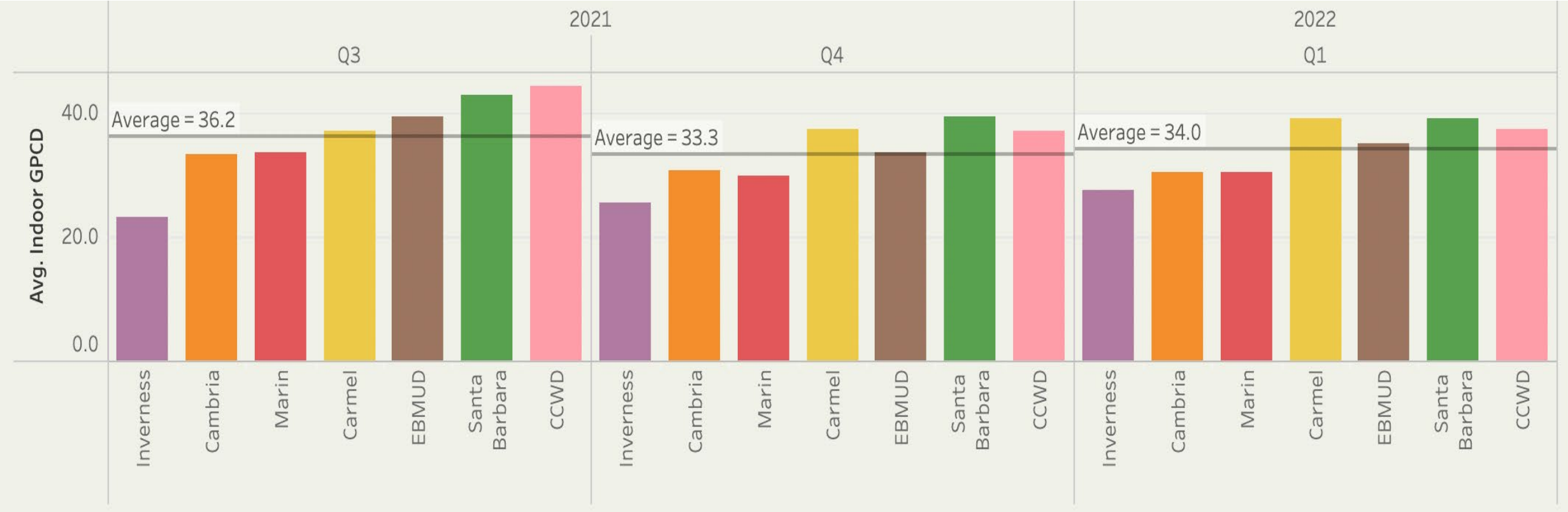
Water Supply Assessment: Residential Outdoor GPHD By Irrigation Type



Water Supply Assessment: Average Residential GPCD



Water Supply Assessment: Comparison of Marin Water to other Highly Efficient Agencies



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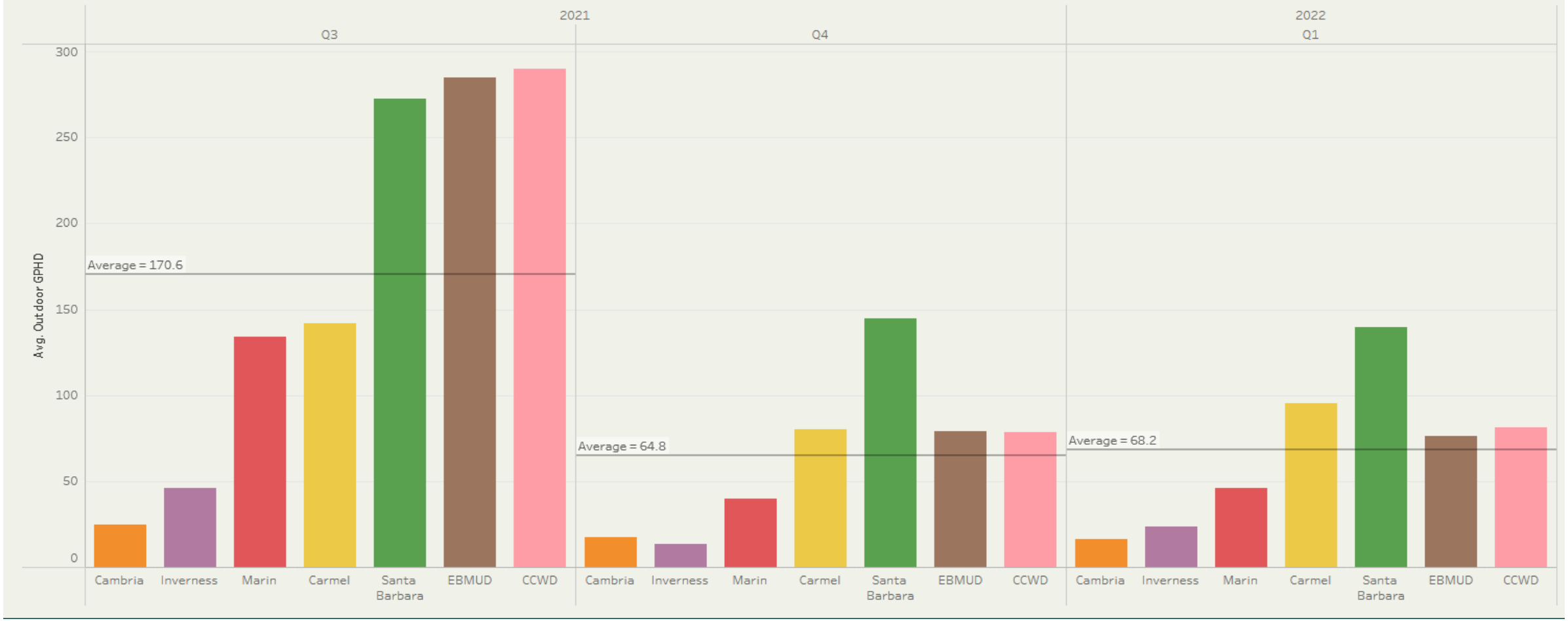
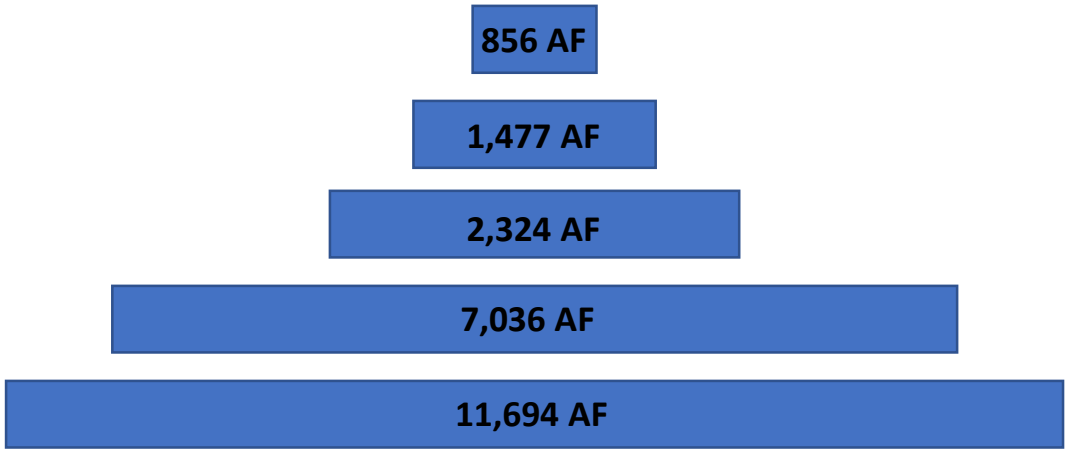


Opportunities for Savings

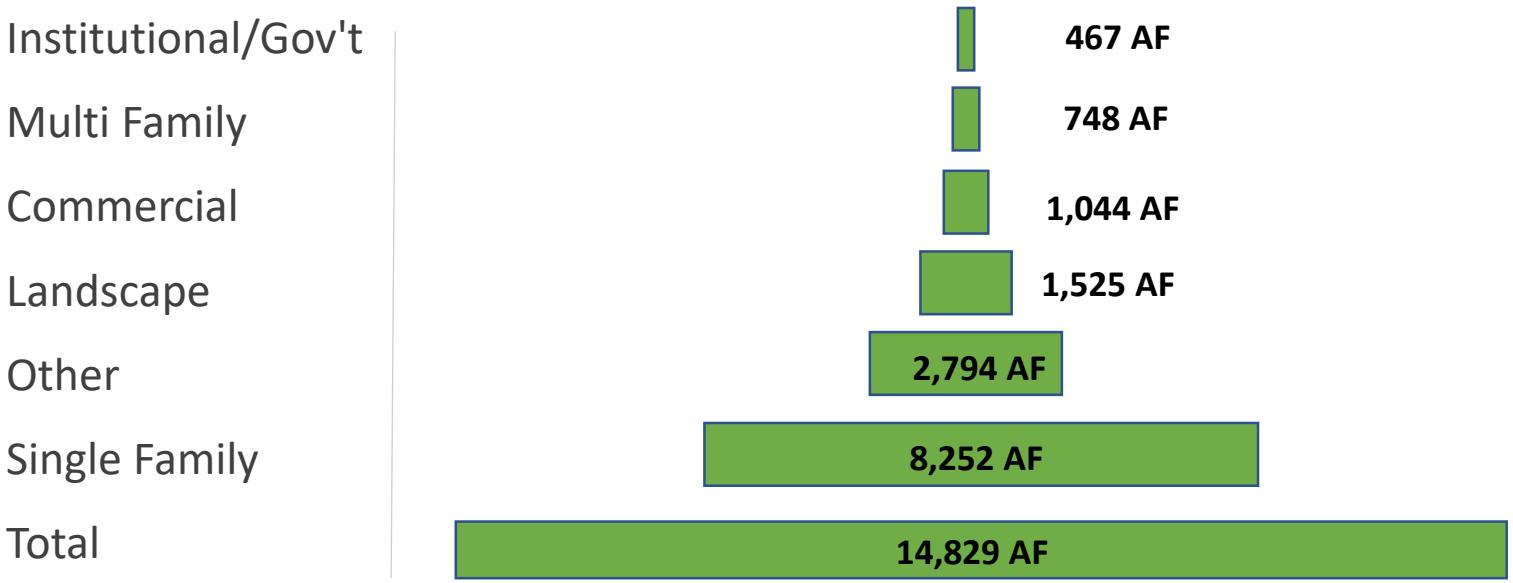
Water Supply Assessment: Potential Indoor Water Use By Sector

- Landscape
- Other
- Institutional/Gov't
- Commercial
- Multi Family
- Single Family
- Total



Historic Single Family Indoor use of 9,020 AF was reduced by 22% to account for winter irrigation.

Water Supply Assessment: Potential Adjusted Outdoor Water Use By Sector



Historic Single Family Outdoor use of 6,268 AF was increased by 22% to account for winter irrigation.

Water Supply Assessment: Summary of Residential Use

- Current Indoor R-GPCD = ~32 gallons per day
- Current Outdoor GPHD = ~53 gallons per day
- Mid-drought (2021) R-GPCD = ~71 gallons per day
- Pre-Drought (2020) R-GPCD = ~85 gallons per day
- Data influenced by response to water shortage emergency, what is likely rebound?
  - Indoor usage savings likely to show some rebound
  - Outdoor will slowly return close to pre drought levels

Water Supply Assessment: Opportunities for Savings

- Single Family Indoor – Limited
- Residential Outdoor – Turf replacement, technology & efficiencies
- Landscape – Plant material, irrigation efficiencies, education
- Other – System losses
- Multi Family – Limited (similar to single family indoor)
- Industrial/Commercial – Largely indoor uses

Water Supply Assessment: Potential For Annual *Indoor* Water Use Savings By Sector

- Single Family residential ~17.5 AFY to 35 AFY
- Multi family ~6 AFY to 12 AFY
- Industrial/Commercial ~1.5 AFY to 3 AFY
- Institutional ~1AFY to 2 AFY
- *Total* Annual Indoor Water Use Savings – ~26 AFY to 52 AFY

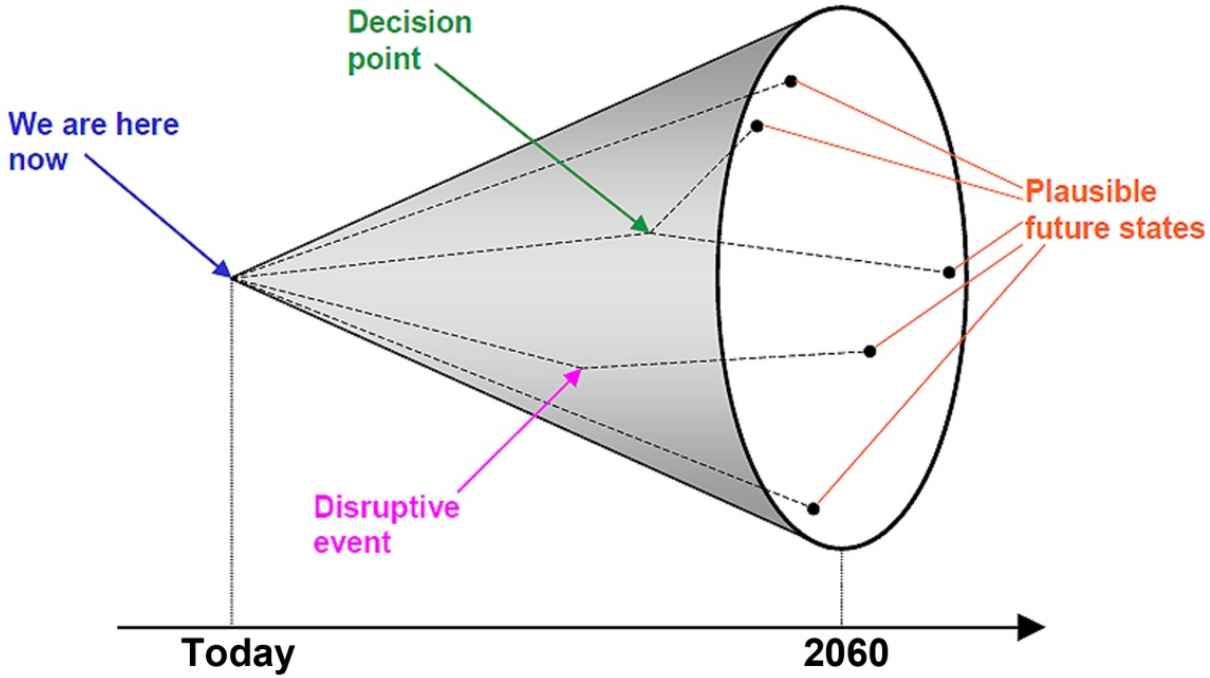
Water Supply Assessment: Potential For Annual *Outdoor* Water Use Savings By Sector

- Single Family Residential Outdoor water use is ~8,252 AFY
  - Participation during the Water Shortage Emergency was about 460 customers or 1% of residential services and a savings of ~35 AFY
  - Range of savings for turf replacement from 10 AFY to 40 AFY
  - Range of savings for non-turf irrigation savings from 6 AFY to 19 AFY
- Range of reductions in water use from:
  - Landscape ~ 4 AFY to 8 AFY
  - Losses/Other ~7 AFY to 14 AFY
- *Total* Annual Outdoor Water Use Savings ~27 AFY to 74 AFY

Scenarios

Water Supply Assessment: Water Supply and Demand Scenarios

- Recognizing that future is uncertain
  - Climate change
  - Drought variability
  - Demands
  - Policies and regulations
- Seeking robust solutions
- Scenarios allow us to explore plausible future conditions and identify promising solutions
  - Historical droughts
  - Climate projections
  - Paleo reconstructions
  - Stress tests



Scenarios are alternative views of how the future might unfold. Scenarios are not predictions or forecasts of the future

Water Supply Assessment: Scenarios

- Scenarios are intended to capture uncertainty that is NOT in management control for this decision
- Water Supply - Hydroclimate
  - Historical
  - Climate projections
  - Paleo reconstructions
  - Synthetic droughts
- Water Demand
  - Recent trends
  - Population growth and land use
  - Passive levels increasing water use efficiency

Water Supply Assessment: Draft Scenarios – *Explore Uncertainties We Don't Control*

- Scenario 1 – Current Trends
  - Historical hydroclimate
  - Continuation of current trends in water use (passive and continuation of existing levels of investments)
  - Resulting total gpcd is approx. 5% less than current by 2045
- Scenario 2 – Accelerated Conservation
  - Historical hydroclimate
  - Accelerated reductions in water use
  - Resulting total gpcd is approx. 10% less than current by 2045
- Scenario 3 – Short and Severe Drought
  - Synthetic or climate projected drought that challenges water supply conditions over
  - Water use trends consistent with scenario 1 or 2
- Scenario 4 – Beyond Drought of Record
  - Long-range, extended severe drought
  - Water use trends consistent with scenario 1 or 2
- Scenario 5 – TBD (Abrupt Disruptions)
  - Wildfire
  - Potter Valley Project
  - Seismic
  - Policy

Water Supply Assessment: Demand Management Options – *Evaluate Active Use of Demand Management to Improve Reliability*

- Approach
  - Demand management actions to be considered with same approach as water supply actions
  - Consider three different levels of demand management measures
  - Differing levels of investment, complexity, and certainty to achieve higher levels of conservation

Schedule & Next Steps

Water Supply Assessment: Schedule

- Periodic Updates and Board Discussions
- Proposed Upcoming Board Discussion Focus Areas
  - May
    - ✓ Demand Management
    - Drought Scenarios & Baseline Reliability
  - June
    - Water Supply Alternatives
    - Evaluation Process
- Public Meetings
  - May/June
  - July/August

Water Supply Assessment: Summary and Next Steps

- Current residential demand is very low due to customer response to water shortage emergency, yet extent of rebound is uncertain
- Scenarios allow planning for multiple possible futures some that could include lower demand (higher levels of conservation) and others that assume other water management actions.
- Continue to develop the Scenarios and the alternatives