Los Osos Water Offset (Title 19) Study Overview

COUNTY OF SAN LUIS OBISPO

August 2023

Topics

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  - Water Savings Potential Estimate
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  - Average Annual Residential Water Usage Estimates
  - Water Savings Potential Estimate
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Study Background

Study Background

Maddaus Water Management

Making a Difference in the World of Water

Available at:

https://www.slocounty.ca.gov/Departments/Planning-Building/Grid-Items/Community-Engagement/Active-Planning-Projects/Los-Osos-Water-Offset-Study.aspx

Study Background
Retrofit-to-Build Program (Title 19)

- Allowed sources of water savings for 2:1 offset:

  Outside the sewer service area

  - Toilet retrofits to 1.28 gallons per flush (gpf)
  - Showerhead retrofits to 2.0 gallons per min. (gpm)

  Basinwide

  - Clothes washing machine retrofits to Integrated Water Factor (IWF) of 3.2 or better
  - Hot water recirculation retrofits

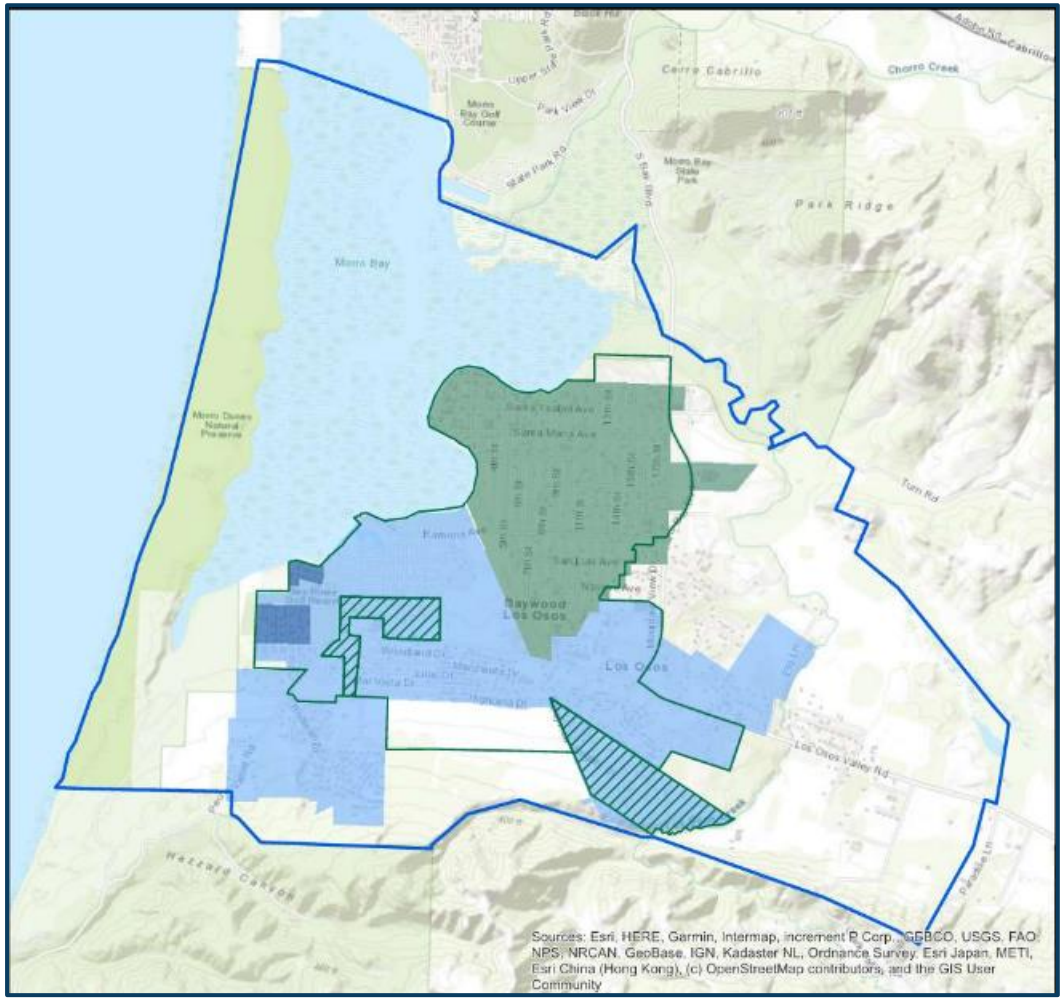
- 56 certificates issued since 2008 (<4 annual average)

Study Background - Intent

- Update average annual residential water use and plumbing fixture use rate estimates
- Estimate remaining water savings potential
- Identify options to increase program reliability

Note: Program changes require the County Board of Supervisors to adopt Title 19 ordinance amendments.

Study Background – Study Area



Legend

- Los Osos Basin Plan Area (2015)

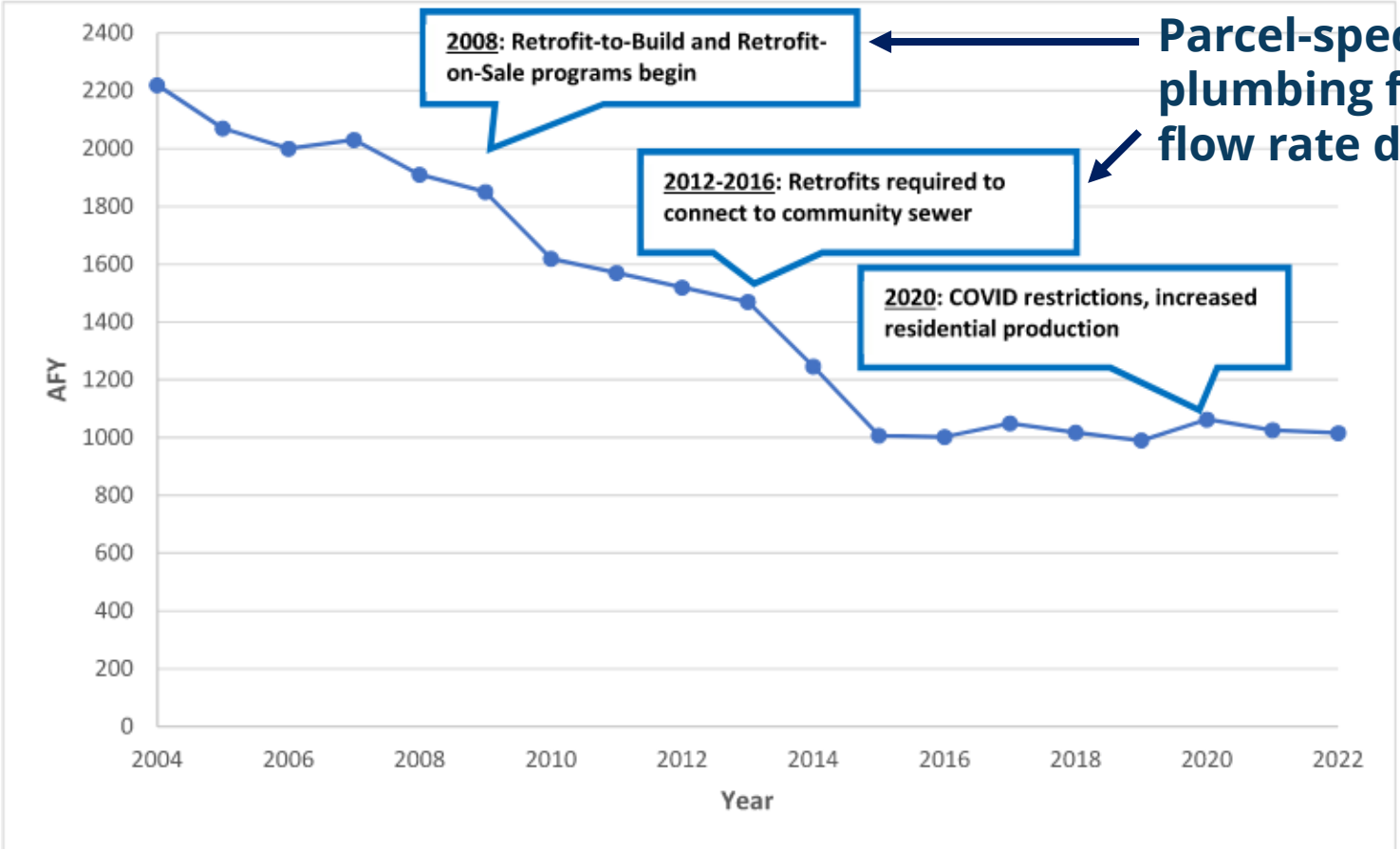
RWQCB Los Osos Prohibition Zone

- Exception from Prohibition Zone
- Prohibition Zone

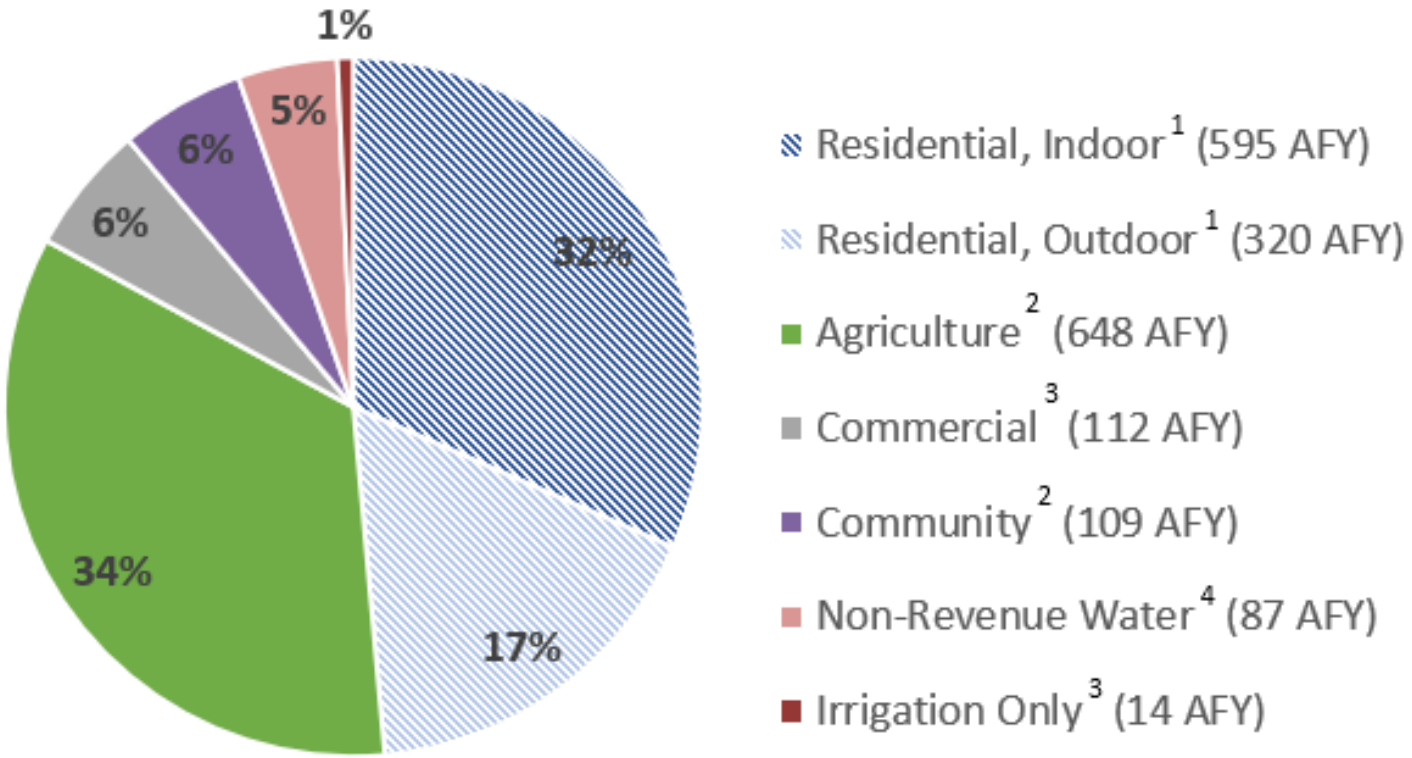
Water Purveyors

- S & T Mutual Water Company
- Golden State Water Company Los Osos
- Los Osos CSD

Study Background – Declining Trend in Water Purveyor Groundwater Production

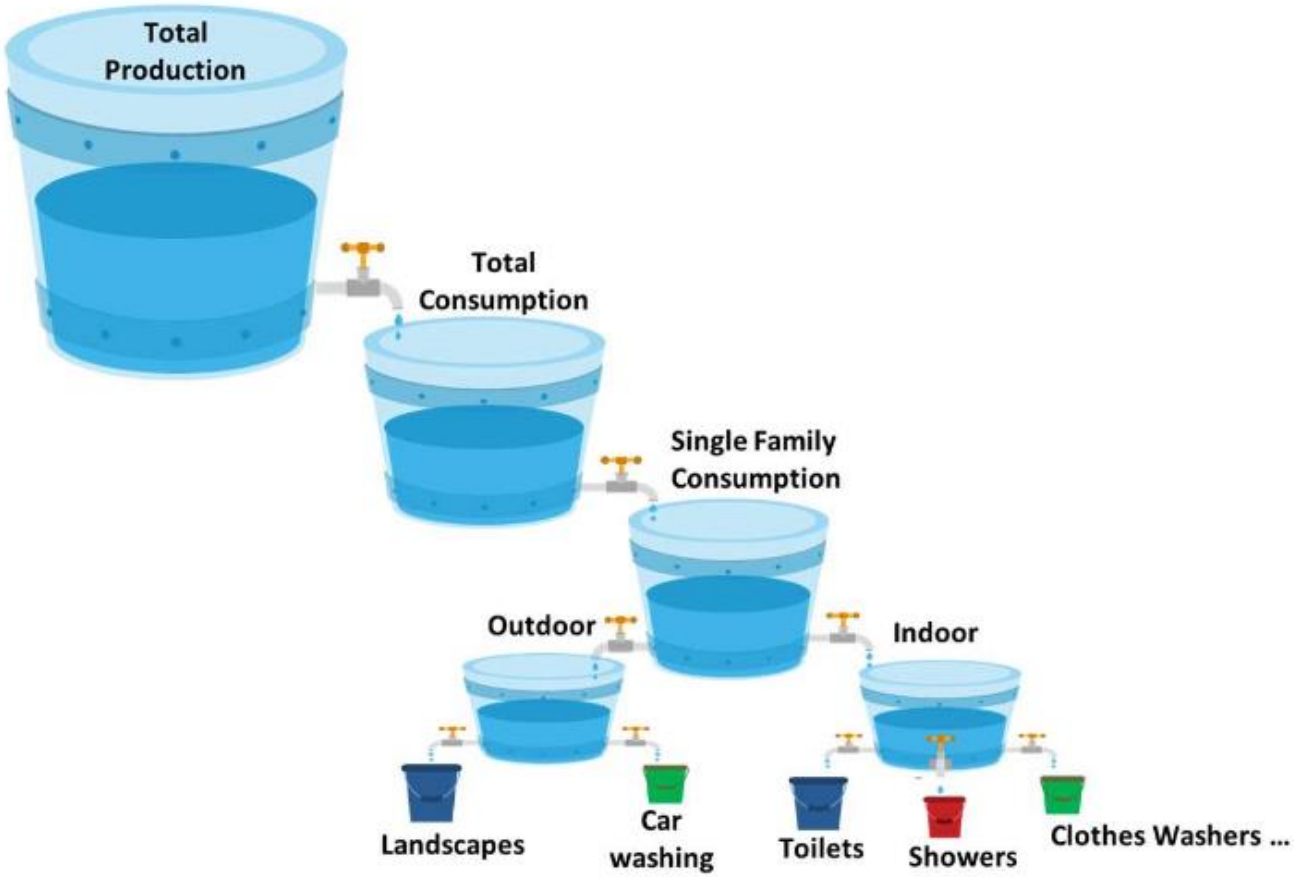


Study Background
Estimated Groundwater Use Profile



Estimated total basinwide production based on a 4-year annual average for 2017-2019 and 2021.
1. Residential water use includes purveyor accounts and domestic private wells.
2. Agriculture and community water use estimates based on 2022 BMC Annual Report.
3. Commercial and irrigation only water use estimates based on water purveyor consumption data.
4. Non-revenue water estimate = water purveyor production – water purveyor consumption.

Study Background – “End Use” Concept



Results Overview

Results - Average Annual Residential Water Usage Estimates (gpd/dwelling unit)

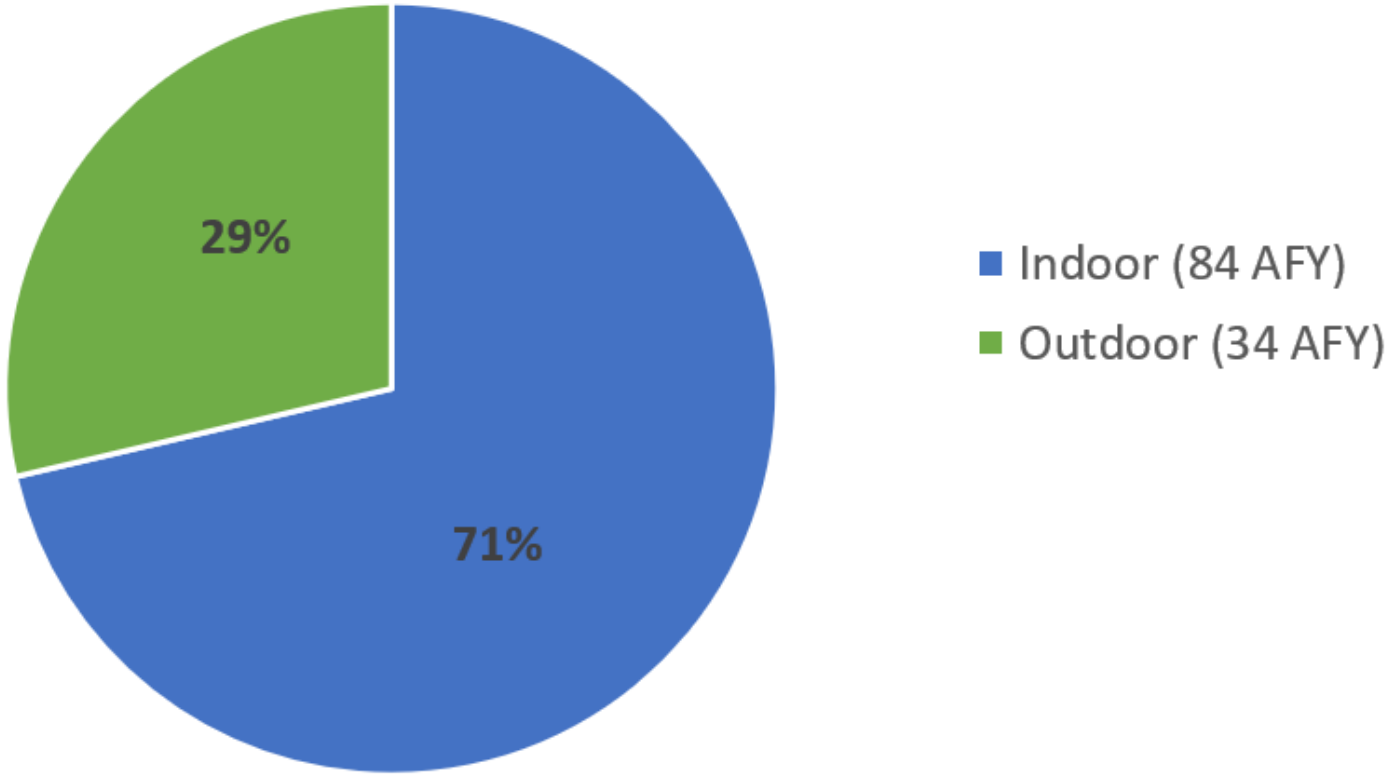
Current program estimates: 150 gpd SF, 112.5 MF

Updated estimates per study findings:

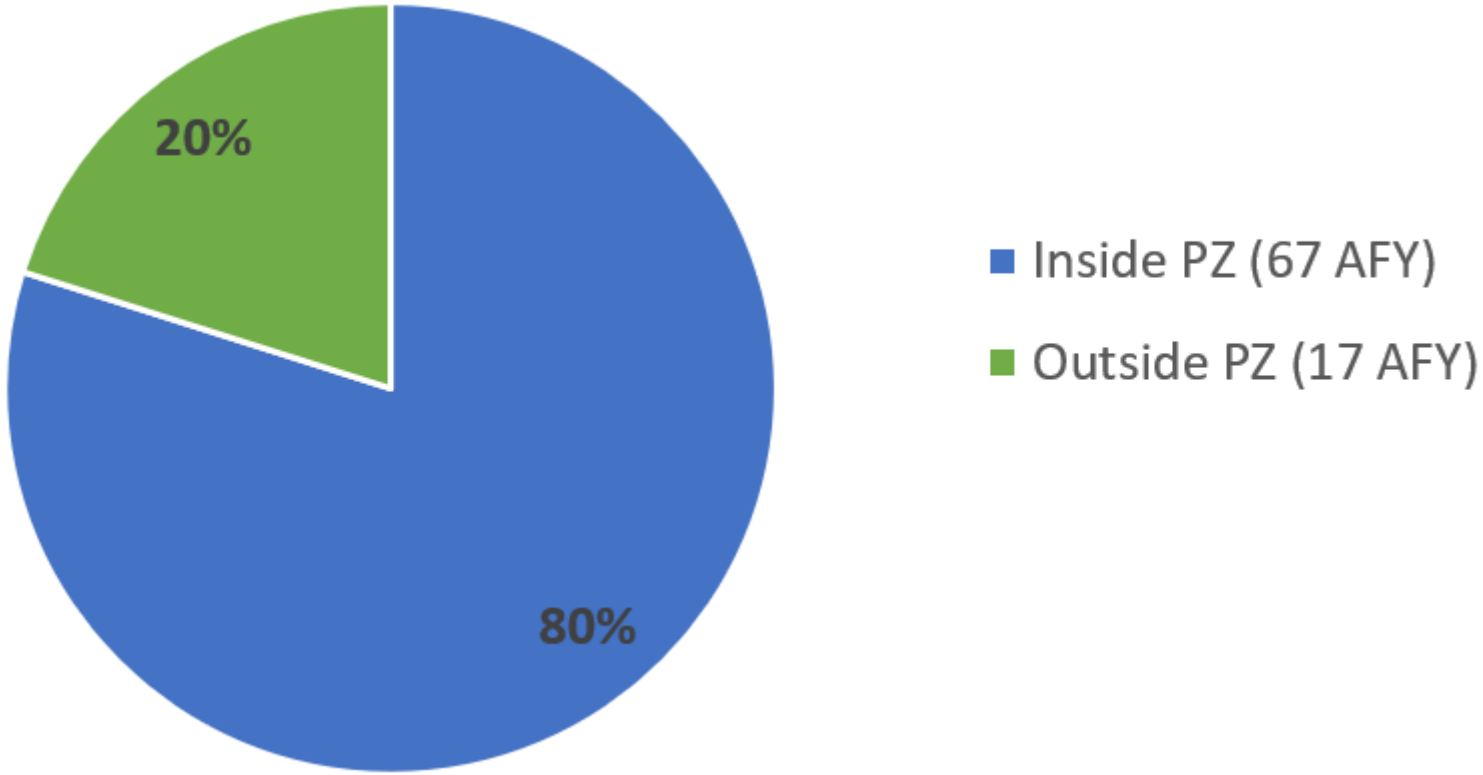
Residence Type [1]	Water Source	Indoor [2]	Outdoor [3]	Total	Percent Indoor and Outdoor
SF	Water Purveyor	92	36	128	72% indoor 28% outdoor
	Self-Source		298	390	24% indoor 76% outdoor
MF	Water Purveyor	58	43	100	58% indoor 43% outdoor
	Self-Source		54	112	52% indoor 48% outdoor

1. SF = Single Family. MF = Multifamily. Mobile homes are considered MF units.
2. Indoor use is considered to be water use for lowest winter month based on billing consumption data analysis.
3. Reference Appendix C for basis of outdoor self-supplied water use estimates.

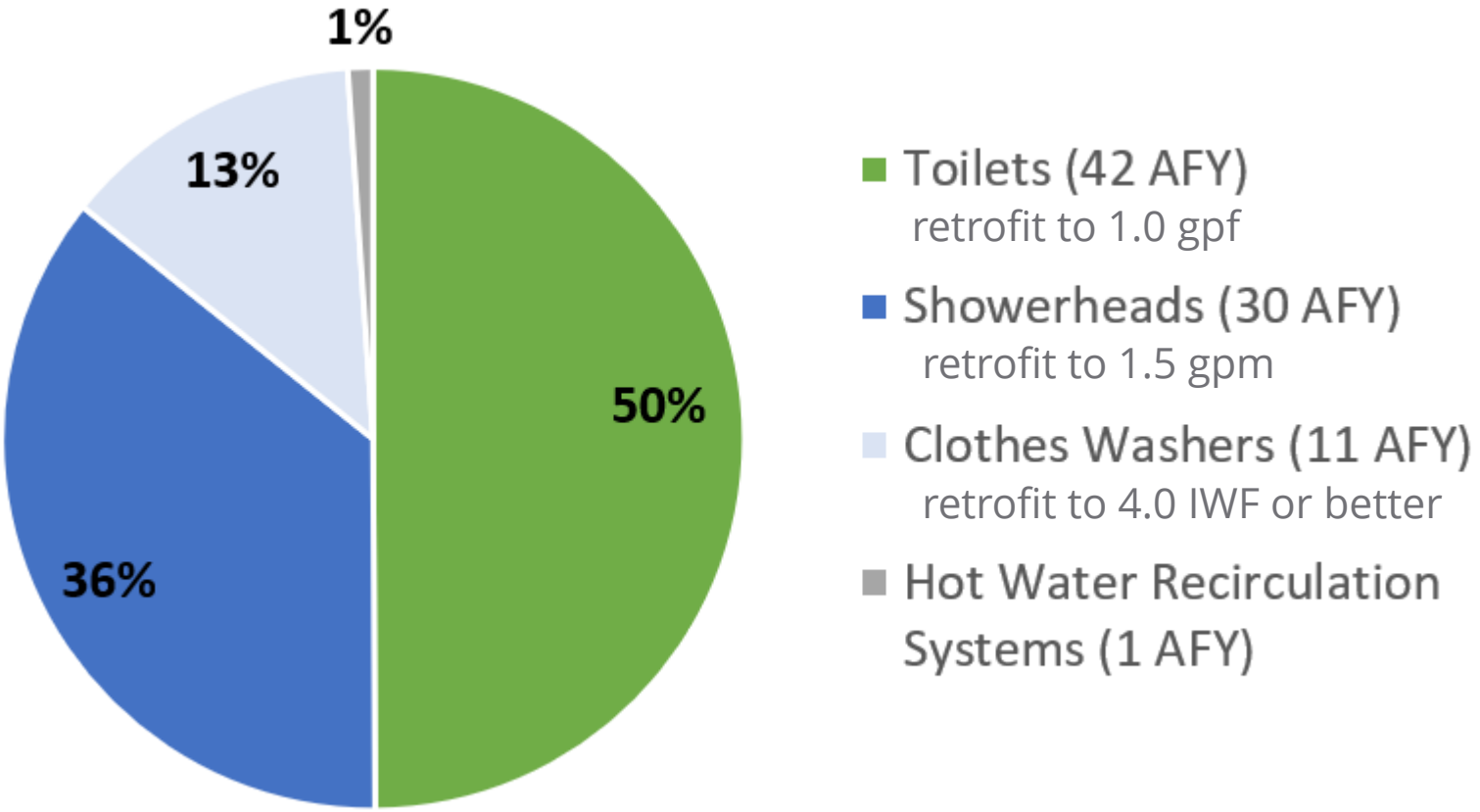
Results – Water Savings Potential Estimate
118 Acre-Feet Per Year (AFY) Total (Residential)



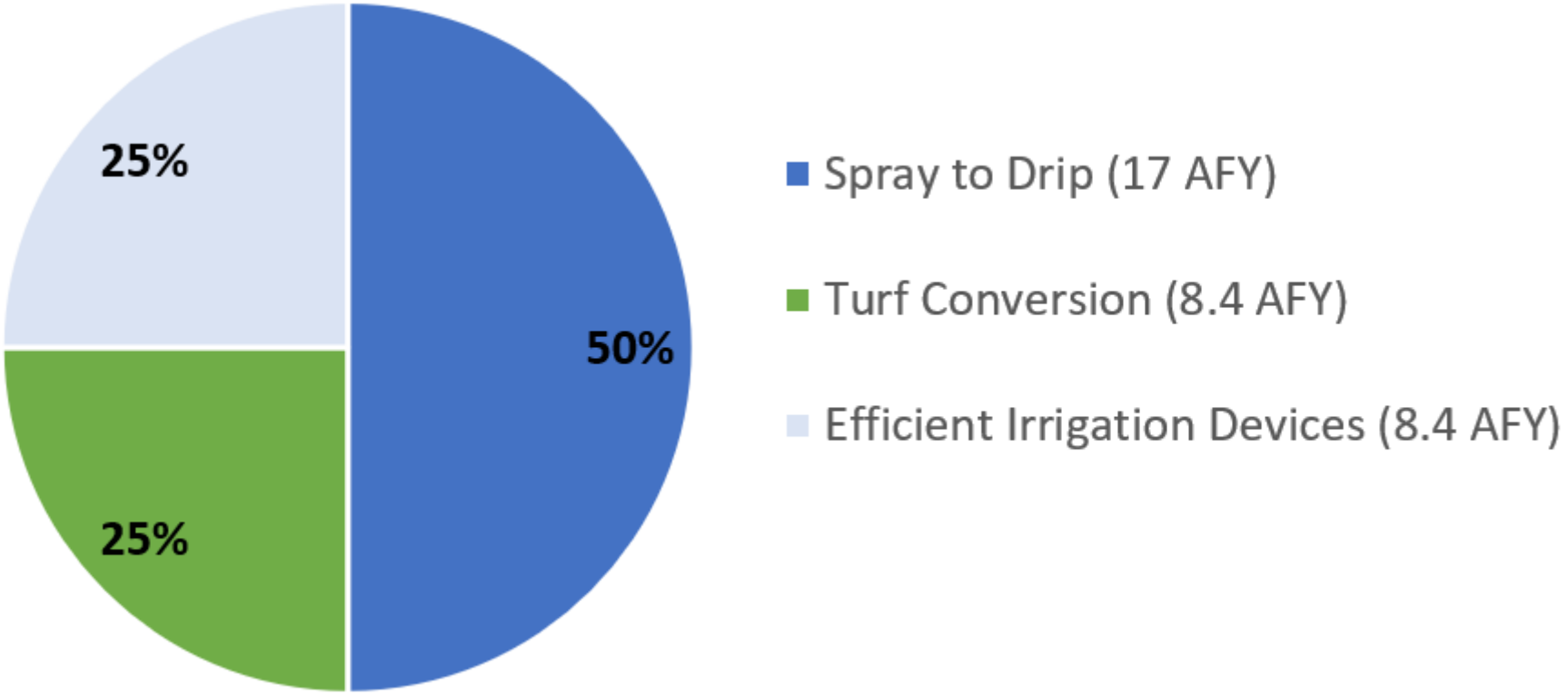
Results – Water Savings Potential Estimate 84 AFY Indoor, in Relation to the PZ



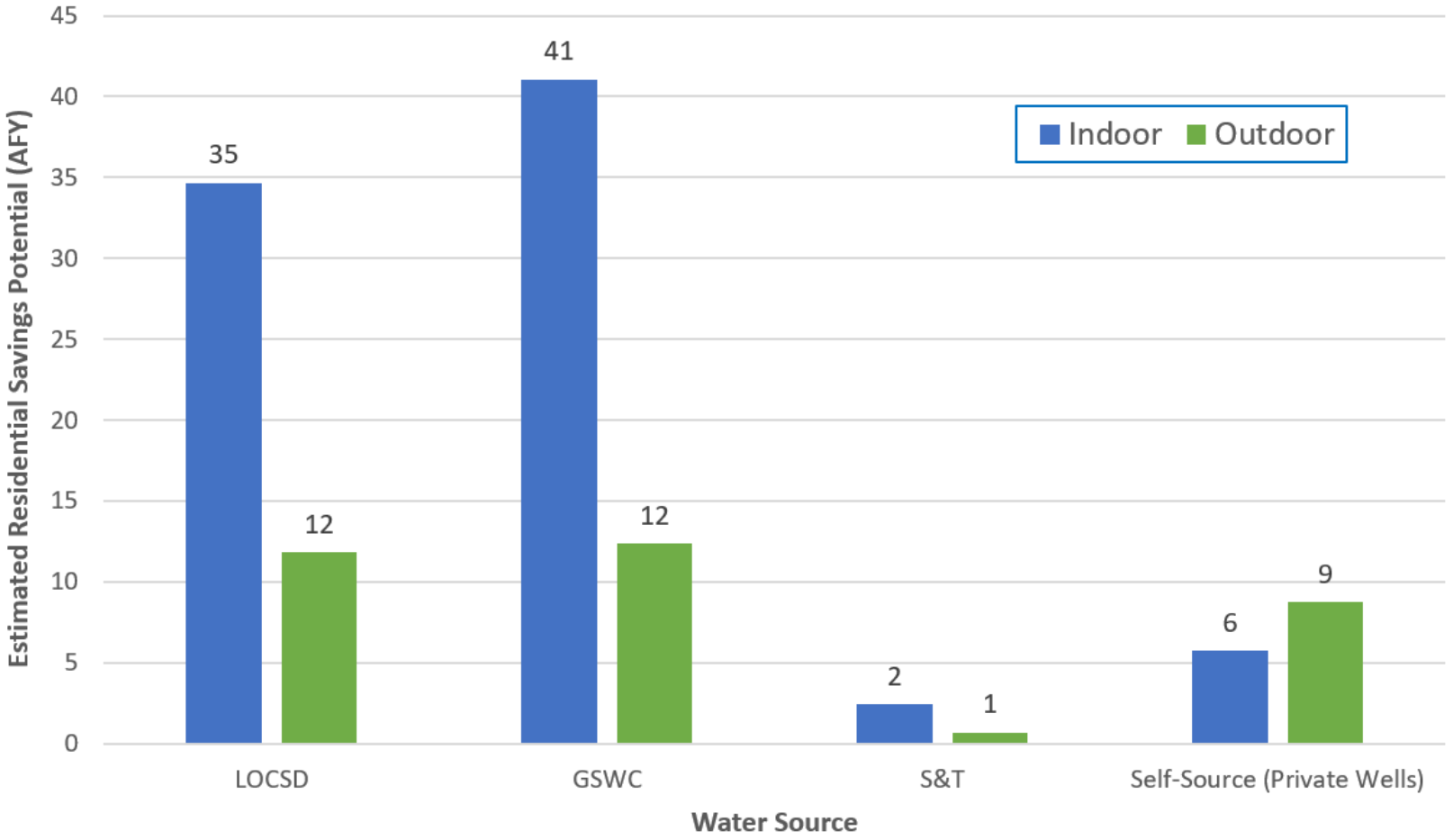
Results – Water Savings Potential Estimate 84 AFY Indoor, by Water Efficiency Measure



Results – Water Savings Potential Estimate 34 AFY Outdoor, by Water Efficiency Measure

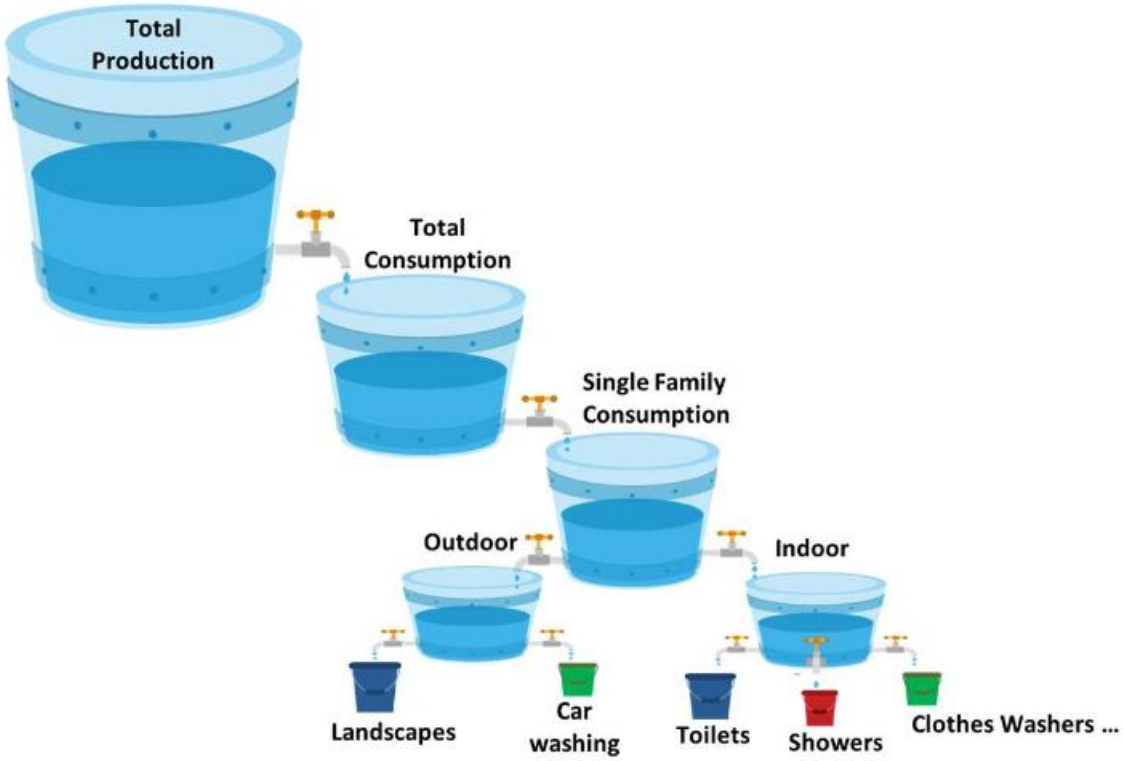


Results – Water Savings Potential Estimate 118 AFY Total (Residential), by Water Source

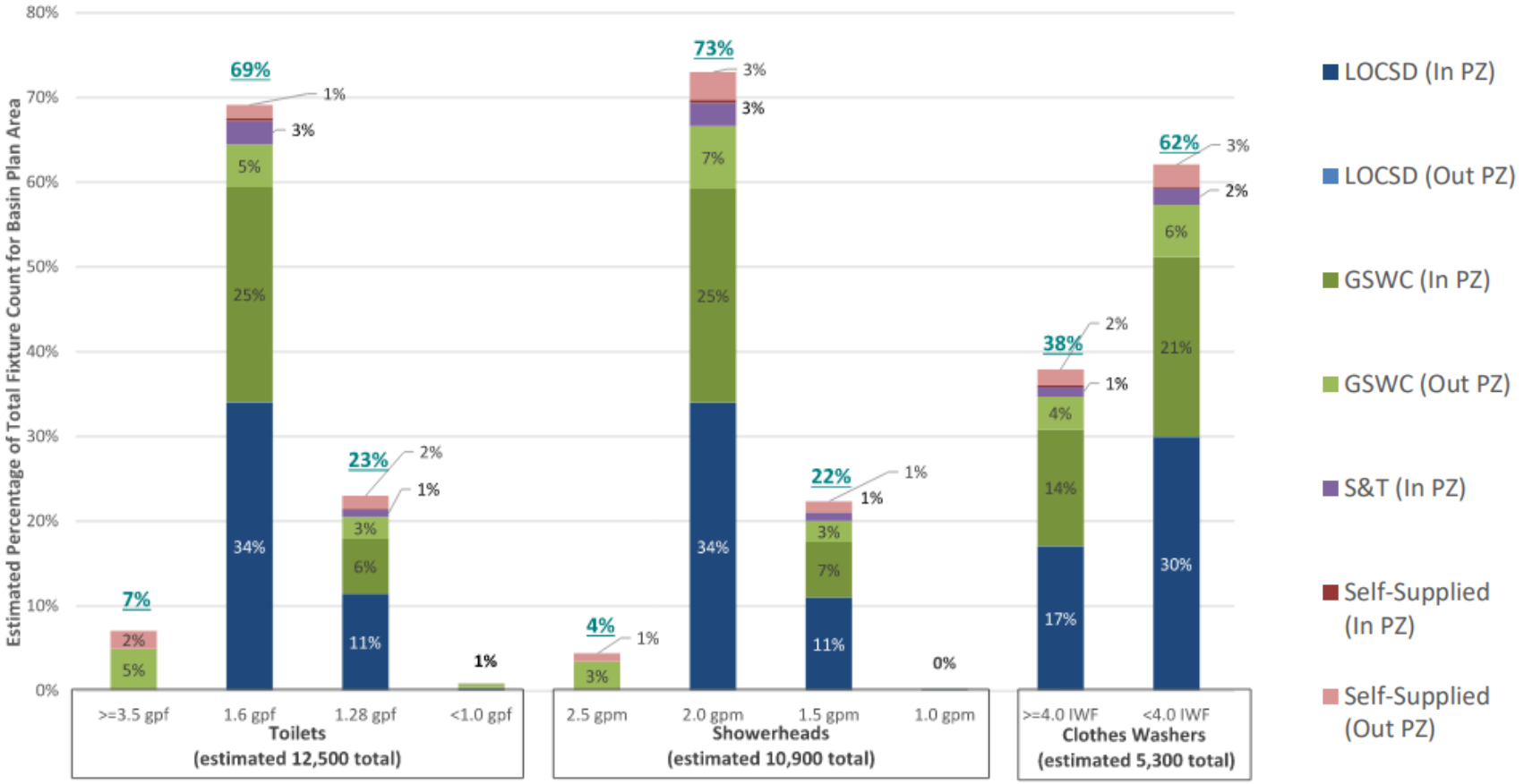


Methods Overview

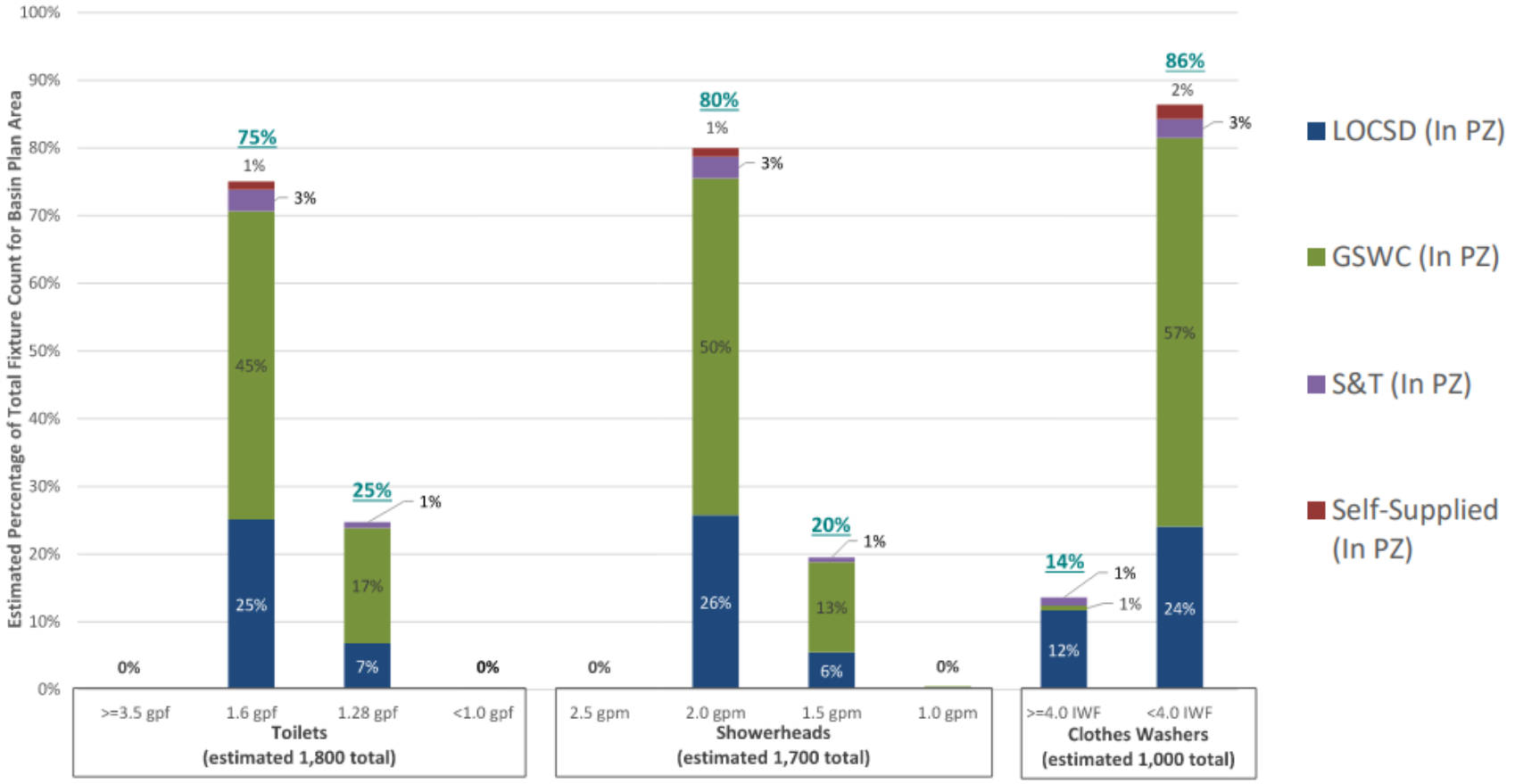
Method – "End Use" Concept for Water Planning



Method – Historical Water Conservation Measures Saturation Analysis *(Single Family)*



Method – Historical Water Conservation Measures Saturation Analysis *(Multi-Family)*



Method – Average Annual Residential Water Usage Estimates (gpd/dwelling unit)

Within water purveyor areas

- Total: 5-year annual weighted average per water purveyor consumption data for 2017-2022, excluding 2020 (COVID)
- Indoor: Lowest winter water use for 5-year period
- Outdoor: total – indoor

Residence Type [1]	Water Source	Indoor [2]	Outdoor [3]	Total	Percent Indoor and Outdoor
SF	Water Purveyor	92	36	128	72% indoor 28% outdoor
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Method – Average Annual Residential Water Usage Estimates (gpd/dwelling unit)

Outside water purveyor areas (private wells)

- Indoor: Same as within water purveyor areas
- Outdoor: Average from parcel-specific 2021 satellite imagery analysis of landscaping areas for all parcels
- Total: indoor + outdoor

Residence Type [1]	Water Source	Indoor [2]	Outdoor [3]	Total	Percent Indoor and Outdoor
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Method – Water Savings Potential Estimate
Indoor – Toilet, Showerhead, Washer Retrofits

$$\frac{\textit{water savings}}{\textit{fixture use}} \times \textit{\# fixtures} \times \textit{fixture use rate} \times \textit{70\% adjustment factor}$$

Toilets and showerheads

= current flow rate – target flow rate

- current flow rates from saturation analysis profile
- target flow rates: 1.0 gpf toilets & 1.5 gpm showerheads

Clothes washers

- 10 gallon per load (conservative assumption)

Method – Water Savings Potential Estimate
Indoor – Toilet, Showerhead, Washer Retrofits

$$\frac{\textit{water savings}}{\textit{fixture use}} \times \textit{\# fixtures} \times \textit{fixture use rate} \times \textit{70\% adjustment factor}$$

from saturation analysis profile

Method – Water Savings Potential Estimate
Indoor – Toilet, Showerhead, Washer Retrofits

$$\frac{\textit{water savings}}{\textit{fixture use}} \times \textit{\# fixtures} \times \textit{fixture use rate} \times \textit{70\% adjustment factor}$$

Table 5-2. Assumptions for Average Daily Fixture Use

Fixture Type	Average Fixture Use	Units per Household
Toilets	5.75 [10]	flushes per person per day
Showerheads	6.3 [11]	minutes per person per day*
Clothes Washing Machines	0.82 [11]	loads per day

*Based on the assumption that 8.7-minute showers occur 0.7 times per day per person[12]

Source: See referenced footnotes. Assuming 2.4 persons per household per 2020 Census Data for Los Osos.

[10] Industry average per https://www.circleofblue.org/wp-content/uploads/2016/04/WRF_REU2016.pdf.

[11] Assumption based on EPA national average use rate of 300 loads per year, or 0.82 loads per day. https://www.energystar.gov/products/clothes_washers.

[12] https://www.epa.gov/sites/default/files/2017-02/documents/ws-ourwater-shower-better-learning-resource_0.pdf

Method – Water Savings Potential Estimate
Indoor – Toilet, Showerhead, Washer Retrofits

$$\frac{\textit{water savings}}{\textit{fixture use}} \times \textit{\# fixtures} \times \textit{fixture use rate} \times \textit{70\% adjustment factor}$$

to account for potential error
in *# fixtures* and *fixture use rates*

Method – Water Savings Potential Estimate
Indoor – Toilet, Showerhead, Washer Retrofits

$$\frac{\textit{water savings}}{\textit{fixture use}} \times \textit{\# fixtures} \times \textit{fixture use rate} \times \textit{70\% adjustment factor}$$

Determined by comparing:

% water savings per fixture use

with

% of total estimated fixture water use saved

Example:

1.28 → 1.0 gpf toilets
= (1.28-1.0)/1.28 = 22% savings

1.6 → 1.0 gpf toilets
= (1.6-1.0)/1.6 = 37.5% savings

Reasonable range: 22% - 37.5%

Method – Water Savings Potential Estimate
Indoor – Toilet, Showerhead, Washer Retrofits

$$\frac{\textit{water savings}}{\textit{fixture use}} \times \textit{\# fixtures} \times \textit{fixture use rate} \times \textit{70\% adjustment factor}$$

Determined by comparing:

% water savings per fixture use

with

% of total estimated fixture water use saved

Example:

Residential Indoor Use	% of Indoor Residential Use
Toilet	24%
Faucet, Bathroom[41]	7%
Faucet, Kitchen[15]	13%
Shower	20%
Clothes Washer	17%
Leak	13%
Bath	3%
Dishwasher	2%
Other	3%
Hot Water Use	33%
20% of Hot Water Use, estimated amt wasted	7%

https://www.circleofblue.org/wp-content/uploads/2016/04/WRF_REU2016.pdf

Method – Water Savings Potential Estimate
Indoor – Toilet, Showerhead, Washer Retrofits

$$\frac{\textit{water savings}}{\textit{fixture use}} \times \textit{\# fixtures} \times \textit{fixture use rate} \times \textit{70\% adjustment factor}$$

Determined by comparing:

% water savings per fixture use

with

% of total estimated fixture water use saved

Example:

$$\frac{avg\ toilet\ water\ savings\ per\ unit}{avg\ toilet\ water\ use\ per\ unit} = \frac{\frac{toilet\ water\ savings}{\#\ targeted\ fixtures} \times \frac{avg\ fixtures}{unit}}{avg\ indoor\ water\ use\ per\ unit\ (24\%)}$$

= within reasonable range?

Method – Water Savings Potential Estimate
Indoor – Hot Water Recirculation Retrofits

Avg indoor water use per unit x *33% hot water use* x *20% hot water wasted* x *50% estimated retrofit savings* x *5% residential units targeted*

[42] https://www.circleofblue.org/wp-content/uploads/2016/04/WRF_REU2016.pdf

[43] Lutz, J. (2005). Estimating Energy and Water Losses in Residential Hot Water Distribution Systems (No. LBNL-57199). Lawrence Berkeley National Lab. (LBNL), Berkeley, CA (United States).

Method – Water Savings Potential Estimate
Outdoor – Landscaping Water Efficiency

Outdoor Water Conservation Measure	Estimated Savings Rate (% of Irrigation*)	Targeted Residences[14]
Spray to Drip	30%[15]	20%
Turf Conversion	30%[16]	10%
Efficient Irrigation Devices	15%[17]	20%

*Assuming irrigation is 83% of average outdoor water use.

[14] Conservative estimate recommended by MWM based on industry experience of what are reasonable participate rates.

[15] Drip/micro-irrigation have an efficiency of 80-95%, compared to landscape spray systems which ranges from 40-65% efficiency (Irrigation Association). Thus, switching from the spray to the drip irrigation, water savings could be between 15-55%. It really depends on initial irrigation efficiency, but on average, drip saves 30-50% more water when compared to conventional sprinkler irrigation. Assume 30% savings to be conservative per MWM recommendation.

[16] Research by Southern Nevada Water Authority (source: Public Policy Institute of California, Lawns and Water Demand in California) estimates that conversion from turf to low-water landscaping resulted in up to a 76% savings. Other savings estimates range from 15% to over 50%. Santa Clarita Water Agency estimates 25%. Liberty Utilities (Park Water Company) estimates 18%. Assume 30% savings to be conservative per MWM recommendation.

[17] Per MWM experience, participating fixtures typically save between 5%-35% of irrigation water use. Assume average of 15%.

Water Offset Program Recommendations

Water Offset Program Recommendations

- Update required water offset for new residences per updated average annual water use estimates.
- Update estimated plumbing fixture daily use rates per referenced industry standards and census data.
- Allow additional toilet and showerhead retrofits within the PZ, to 1.0 gpf and 1.5 gpm, respectively.
- Include outdoor water conservation measures with sufficient verification of continued water savings.
- Monitor water use trends.

Questions?

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