

# **RAYMOND BASIN SNMP PLATES**

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SOURCE : Regional Water Board Assistance in Guiding Salt and Nutrient Management Plan Development in the Los Angeles Region. June 28, 2012.



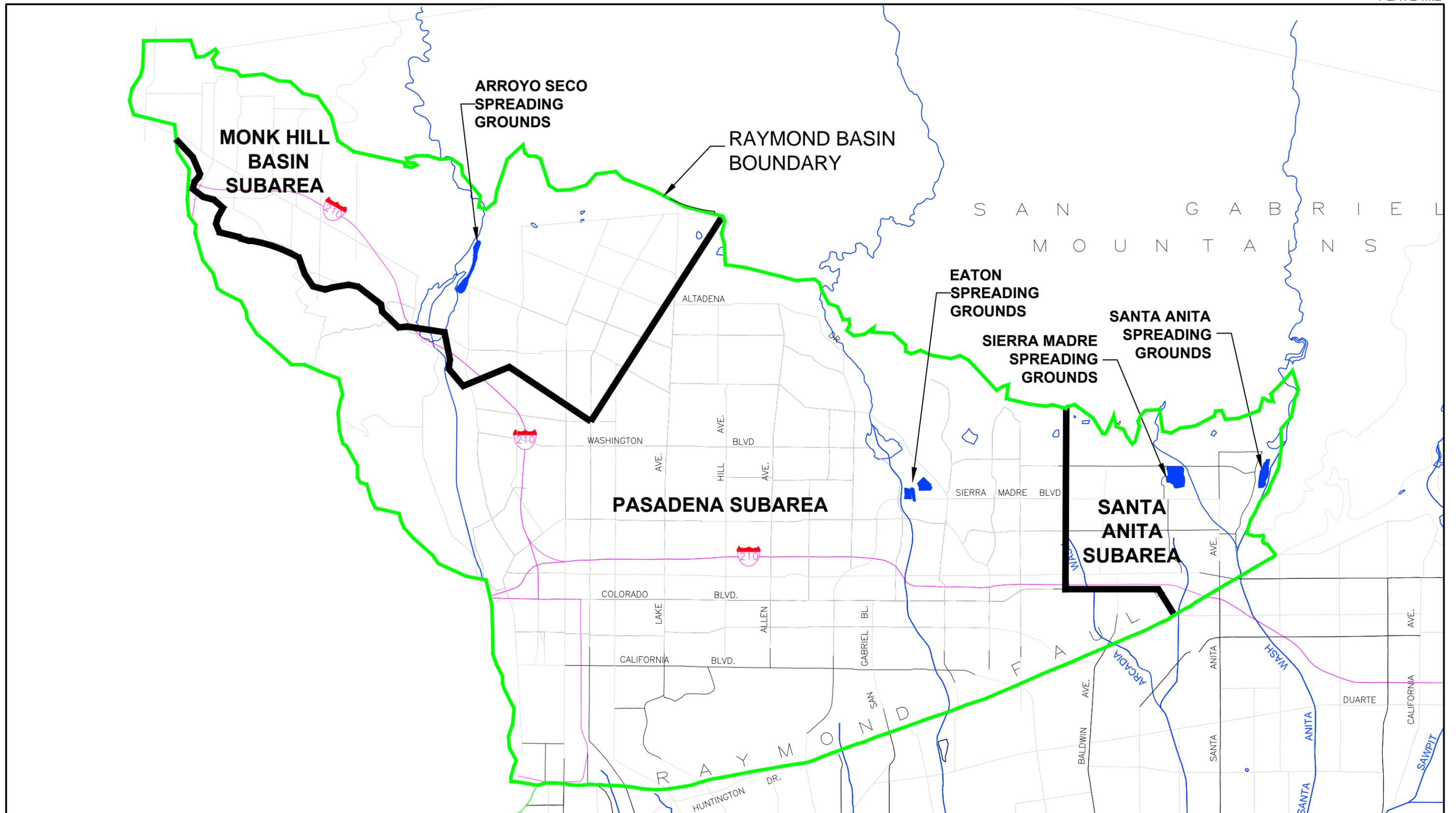
861 VILLAGE OAKS DRIVE, SUITE 100  
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 FAX: (626) 331-7065

2171 E Francisco Blvd., Suite K  
 San Rafael California 94901

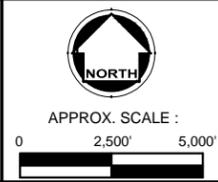
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### RAYMOND BASIN MANAGEMENT BOARD

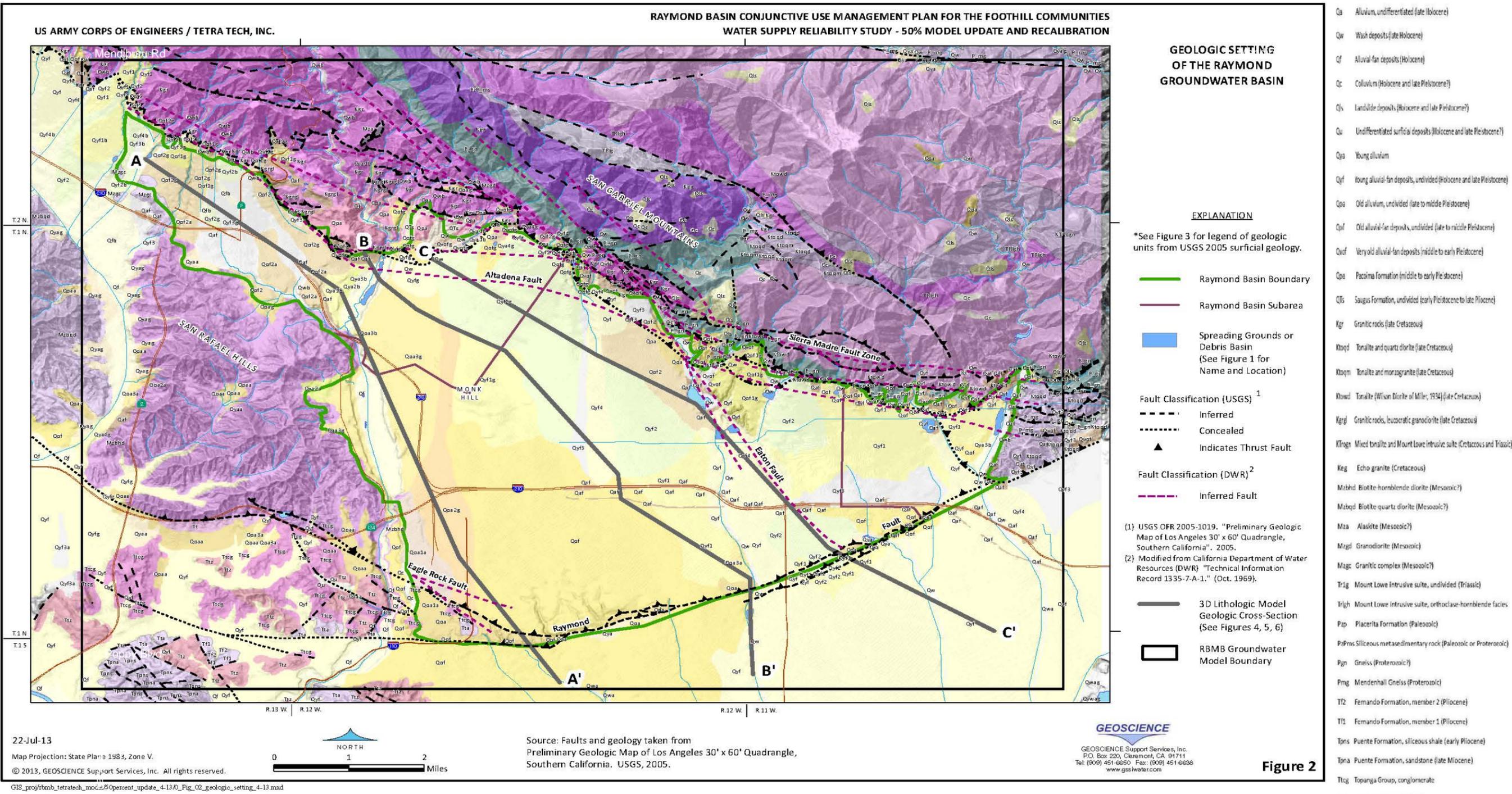
### GROUNDWATER BASINS WITHIN THE LOS ANGELES REGION



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**RAYMOND BASIN MANAGEMENT BOARD**  
**RAYMOND BASIN HYDROLOGIC SUBUNITS**



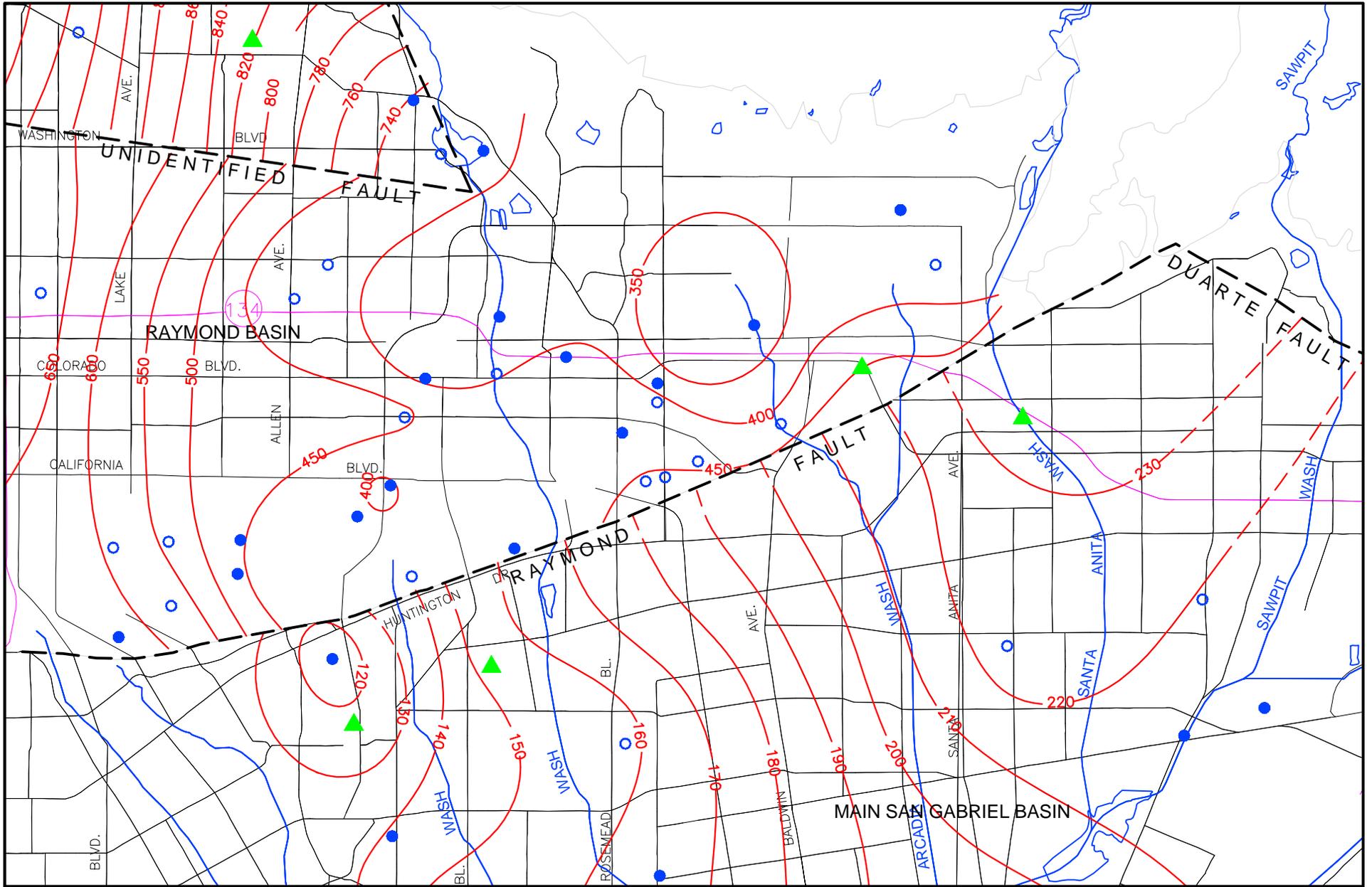
SOURCE: Figure 2 - Raymond Basin Conjunctive Use Management Plan for the Foothill Communities Water Supply Reliability Study - 50% Model Update and Recalibration, Geoscience. July 22, 2013

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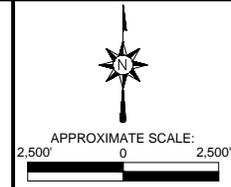
**GENERAL GEOLOGY OF THE RAYMOND BASIN**



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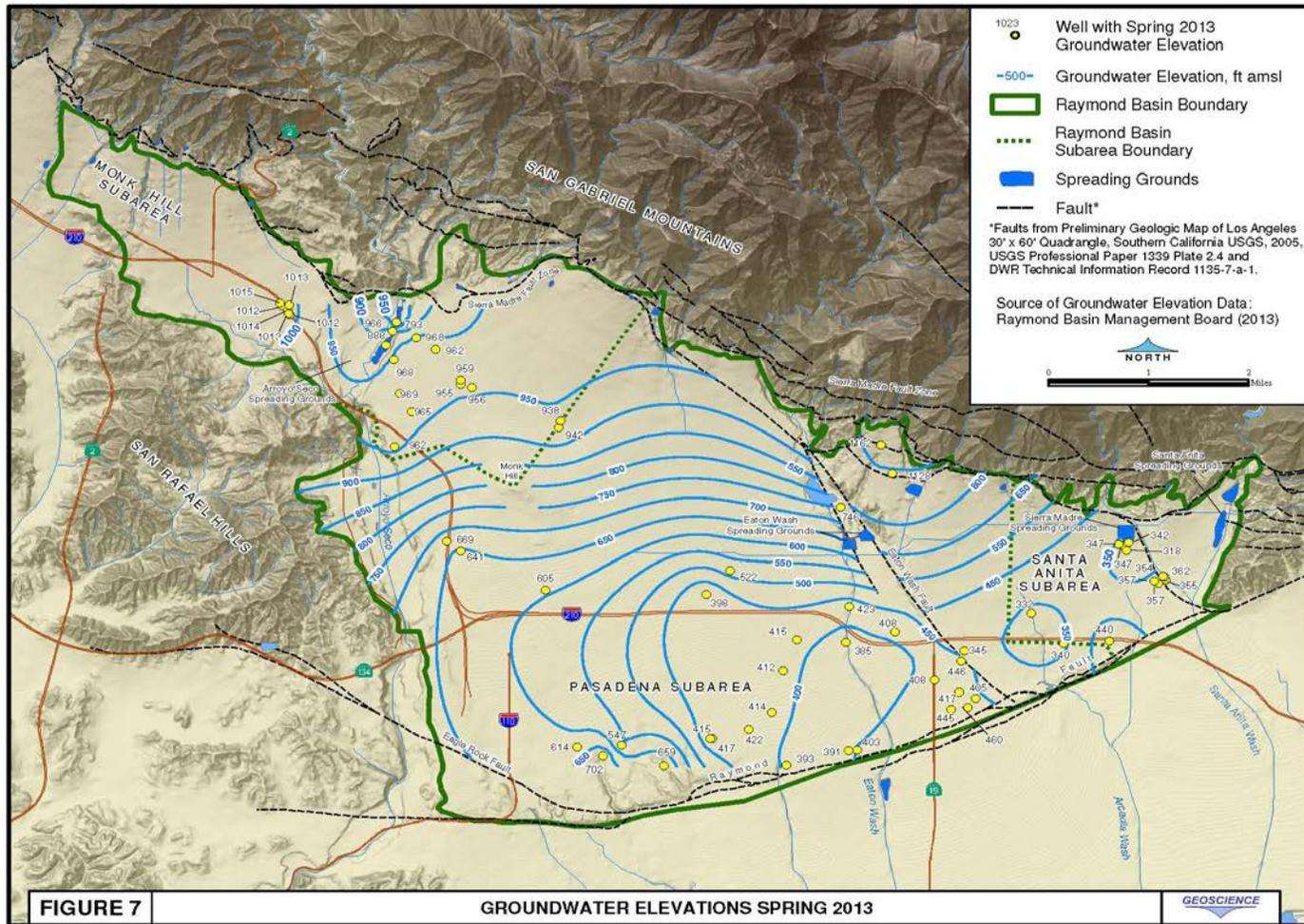



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**DIFFERENCES IN WATER LEVEL ELEVATIONS  
ACROSS RAYMOND FAULT (OCTOBER 2007)**



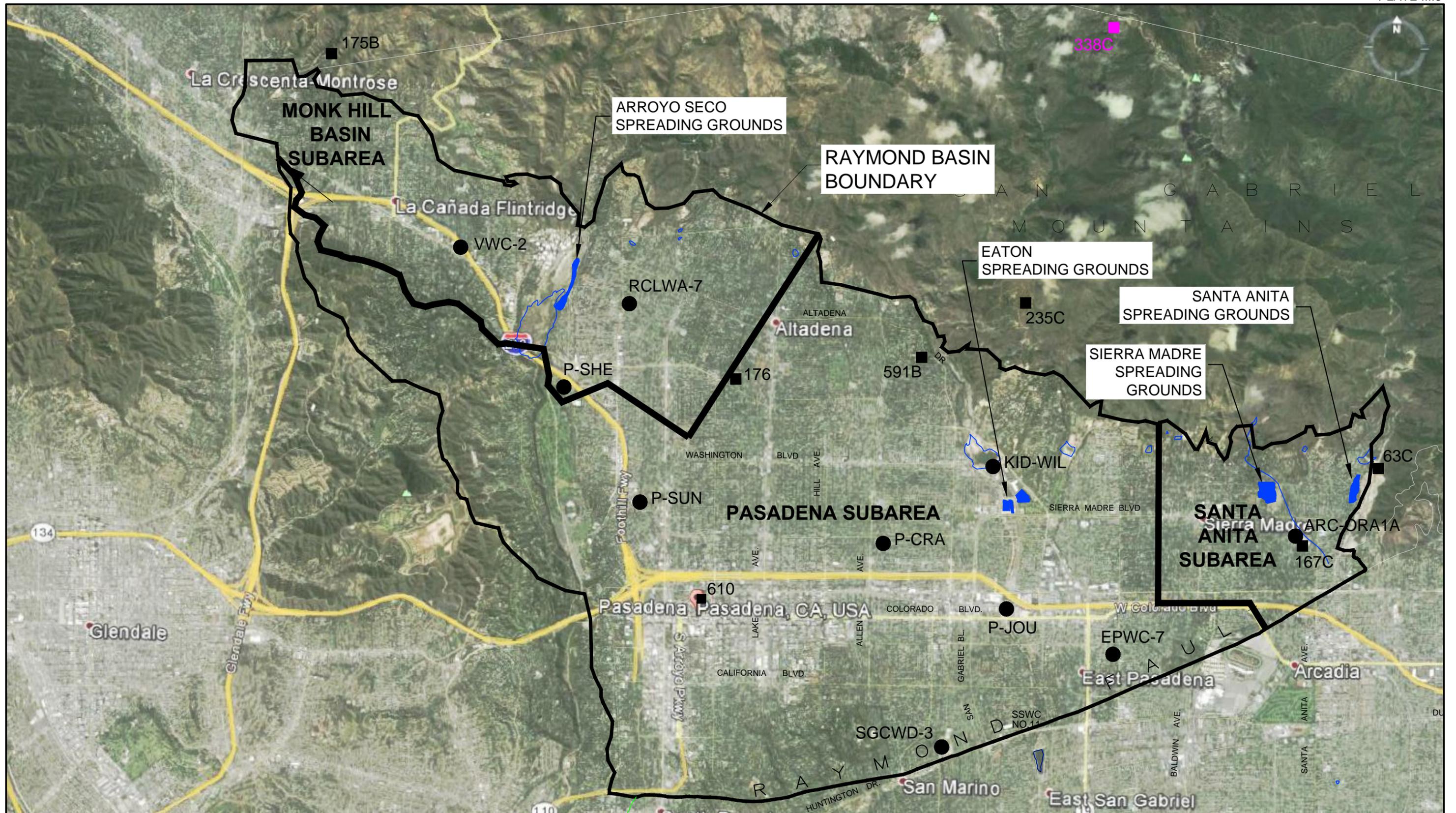
Source: Annual Report July 1, 2012 - June 30, 2013. Raymond Basin Management Board. September 2013.



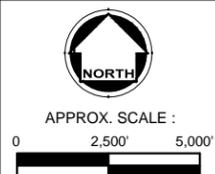
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GROUNDWATER CONTOURS FOR RAYMOND BASIN - SPRING 2013



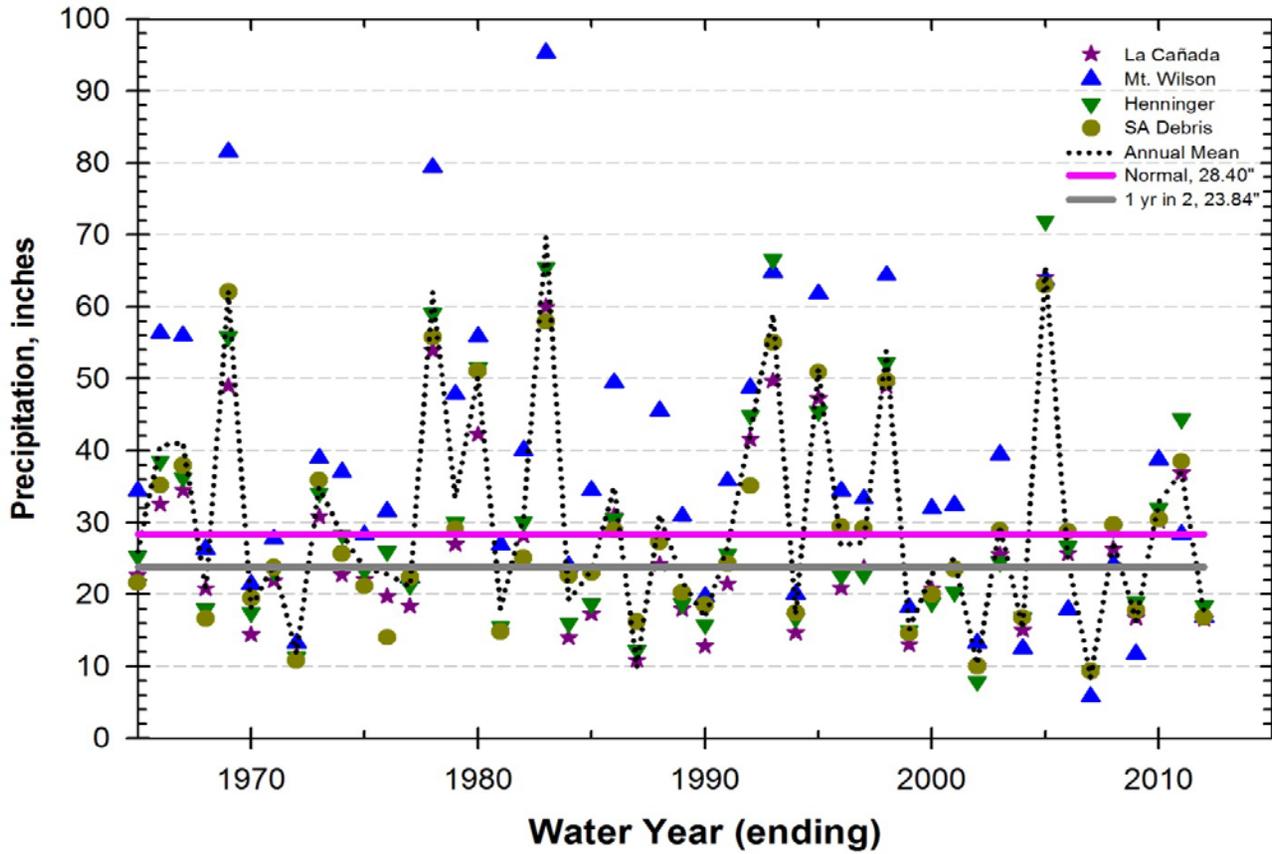
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**RAYMOND BASIN PRECIPITATION STATIONS AND KEY WELLS LOCATION**

### Raymond Basin Mountain Watershed Precipitation

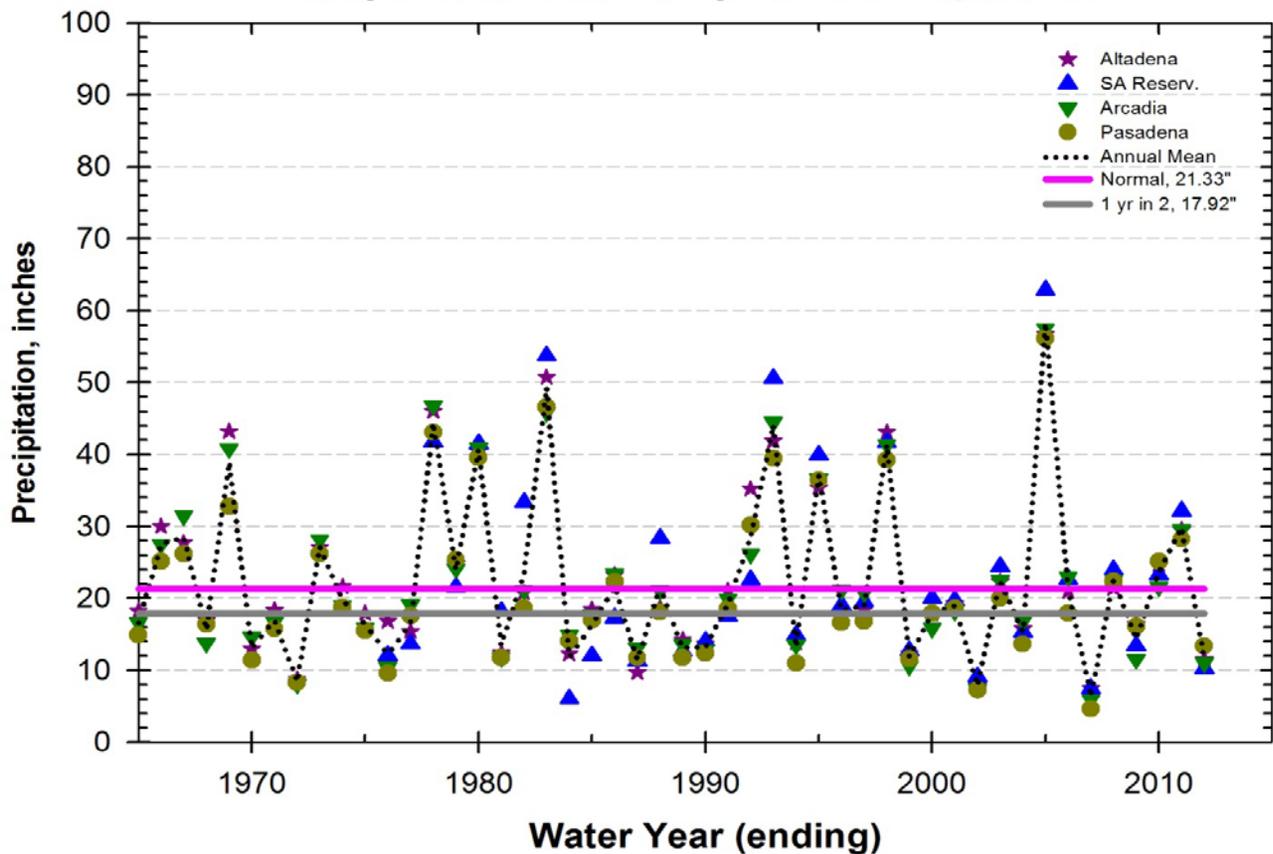


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PRECIPITATION IN RAYMOND BASIN (MOUNTAIN WATERSHED)

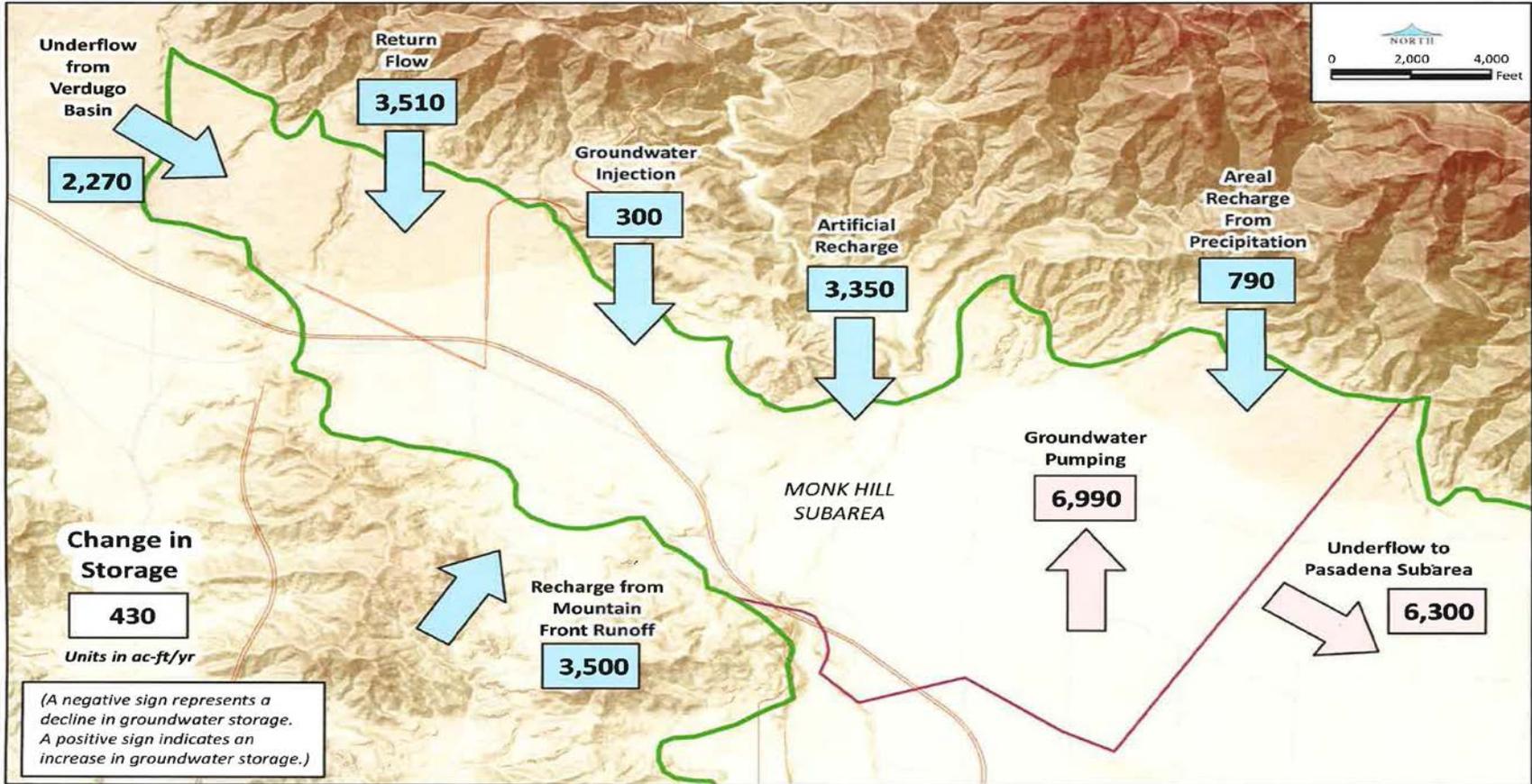
### Raymond Basin Valley Floor Precipitation



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PRECIPITATION IN RAYMOND BASIN (VALLEY FLOOR)



22-Jul-13

Prepared by: DWB. Map Projection: UTM NAD 1927, Zone 11.

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GIS\_proj/rbmb\_tetrattech\_model/50percent\_update\_7-13/0\_Fig\_35\_8x11\_monk\_baseline\_7-13.mxd

— Raymond Basin Boundary  
— Raymond Basin Subareas

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**AVERAGE ANNUAL WATER BUDGETS FOR MONK HILL SUBAREA FOR MODEL CALIBRATION JANUARY 1981 - APRIL 2012**

Figure 35

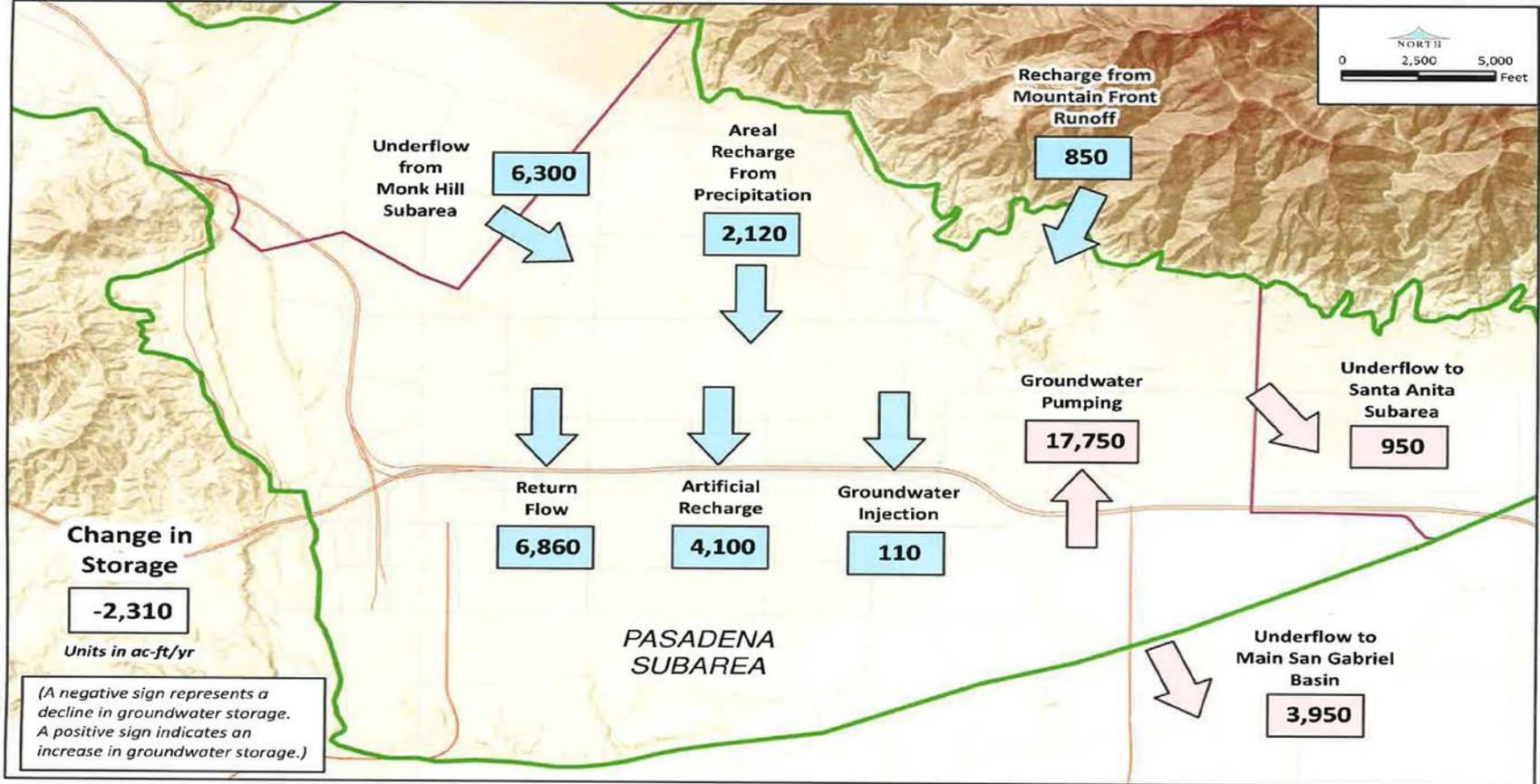
Source: Raymond Basin Conjunctive Management Plan for the Foothill Communities Water Reliability Study 50% Model Update and Recalibration. Geoscience. July 22, 2013



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ANNUAL WATER BUDGETS (MONK HILL SUBAREA)



22-Jul-13

Prepared by: DWB. Map Projection: UTM NAD 1927, Zone 11.

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GIS\_proj/rbmb\_tetrattech\_model/50percent\_update\_7-13/0\_Fig\_36\_8x11\_pasadena\_baseline\_7-13.mxd

— Raymond Basin Boundary  
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**AVERAGE ANNUAL WATER BUDGETS FOR PASADENA SUBAREA FOR MODEL CALIBRATION JANUARY 1981 - APRIL 2012**

Figure 36

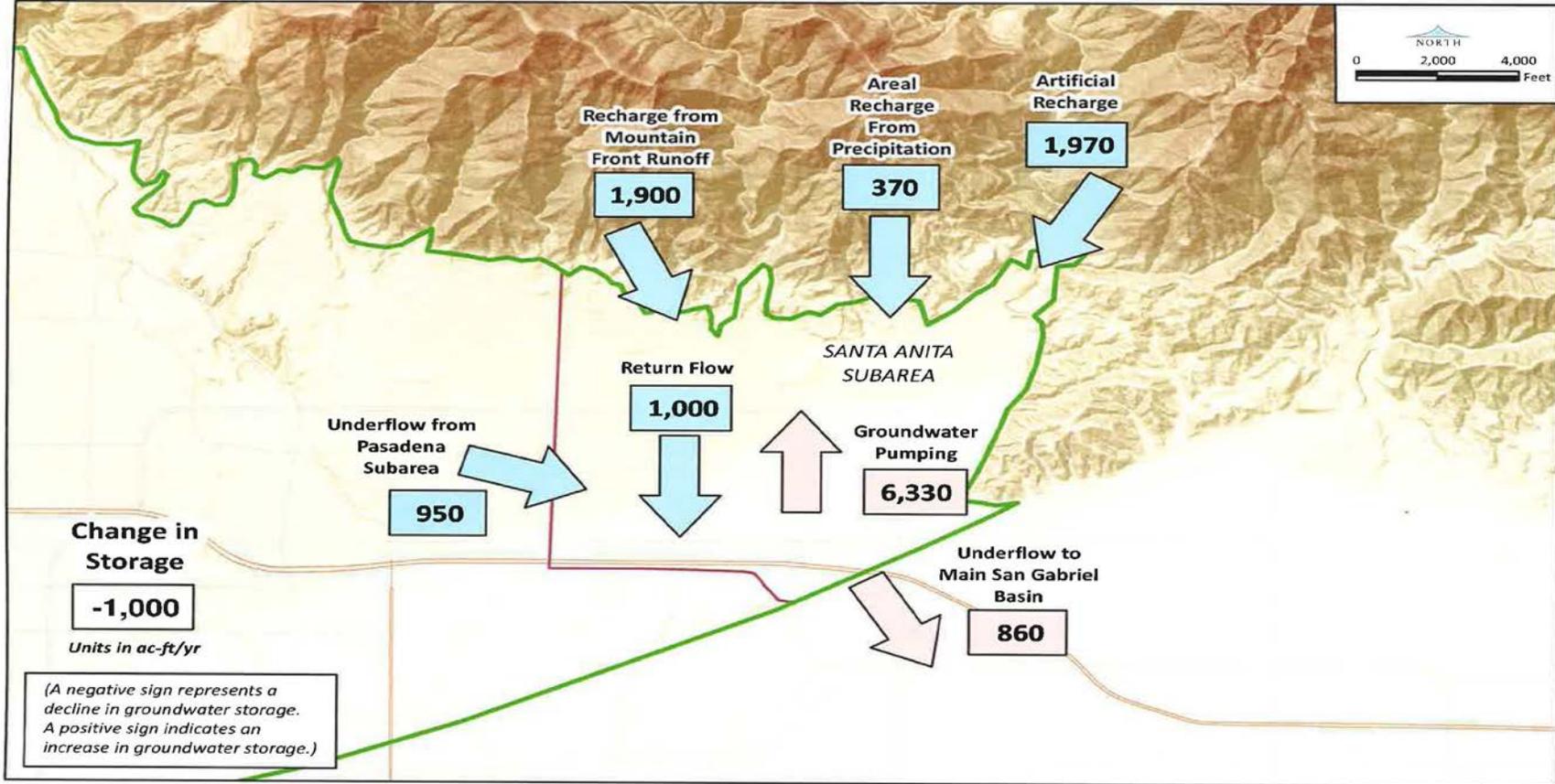
Source: Raymond Basin Conjunctive Management Plan for the Foothill Communities Water Reliability Study 50% Model Update and Recalibration. Geoscience. July 22, 2013



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ANNUAL WATER BUDGETS (PASADENA SUBAREA)



22-Jul-13

Prepared by: DWB. Map Projection: UTM NAD 1927, Zone 11.

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GIS\_proj/rmb\_tetrattech\_model/50percent\_update\_7-13/0\_Fig\_37\_8x11\_santaanita\_baseline\_7-13.mxd

— Raymond Basin Boundary  
— Raymond Basin Subareas

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**AVERAGE ANNUAL WATER BUDGETS FOR SANTA ANITA SUBAREA FOR MODEL CALIBRATION JANUARY 1981 - APRIL 2012**

Figure 37

Source: Raymond Basin Conjunctive Management Plan for the Foothill Communities Water Reliability Study 50% Model Update and Recalibration. Geoscience. July 22, 2013

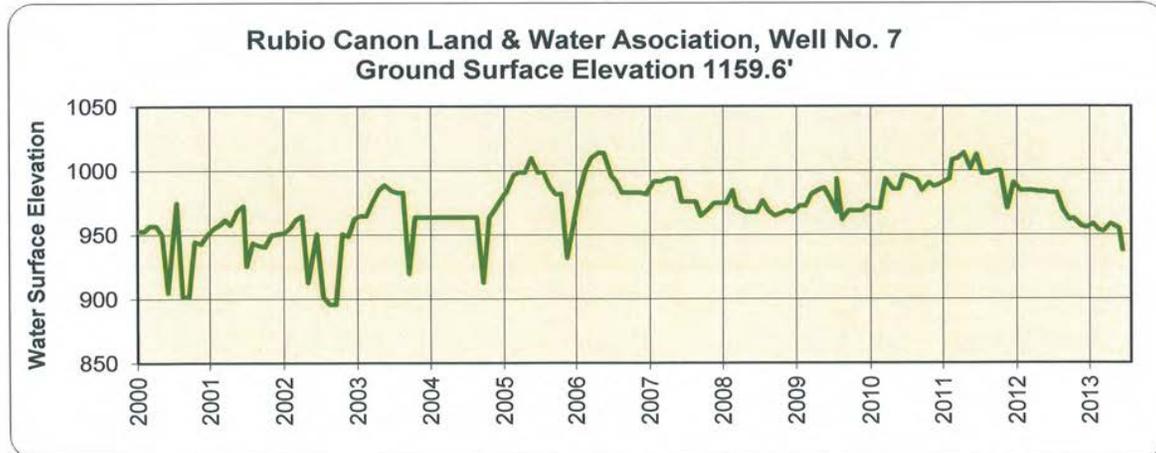
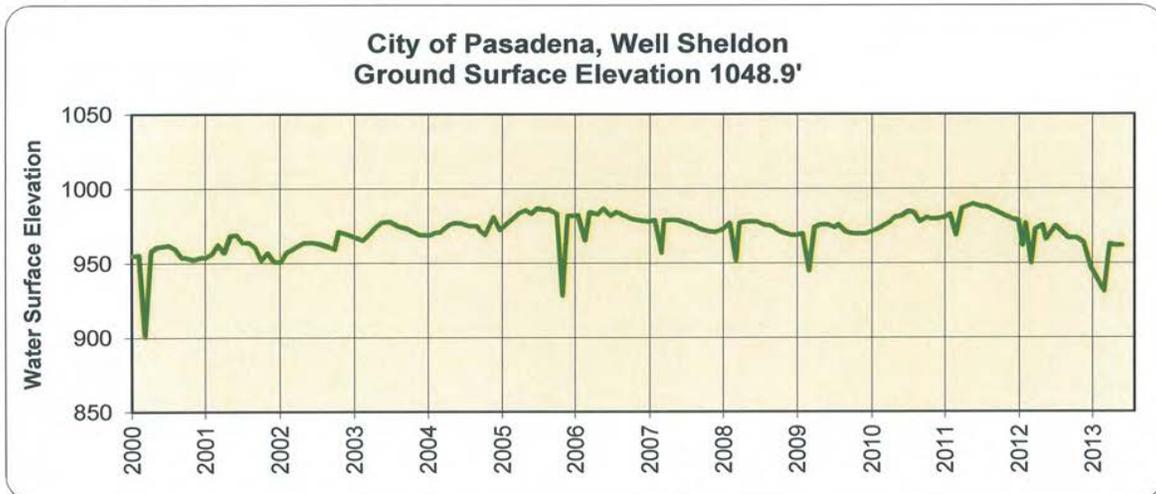
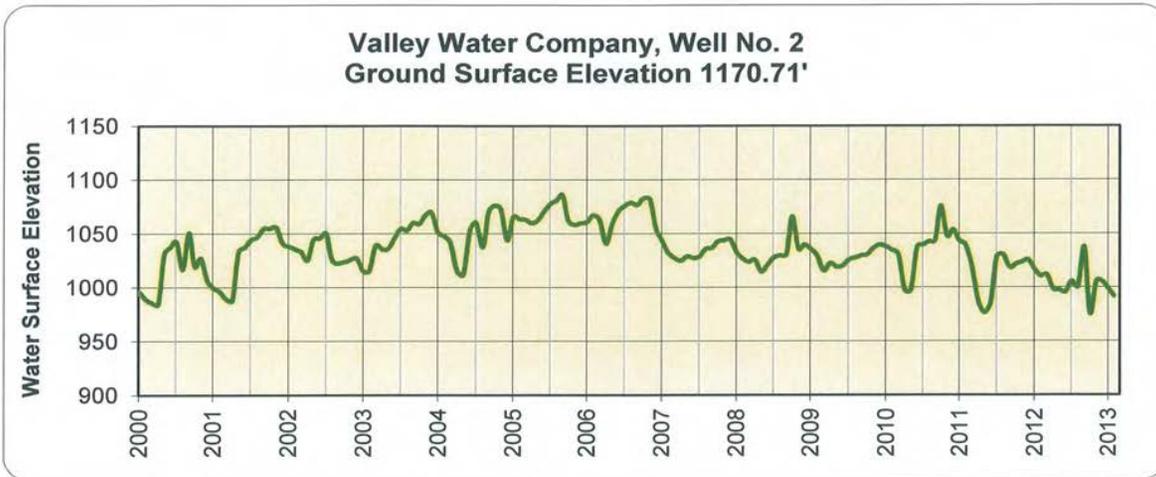


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ANNUAL WATER BUDGETS (SANTA ANITA SUBAREA)

FIGURE 12 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE MONK HILL SUBAREA



SOURCE: Raymond Basin Management Board Annual Report, September 2013



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KEY WELLS ELEVATION HYDROGRAPHS  
(MONK HILL SUBAREA)

FIGURE 10a - FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA

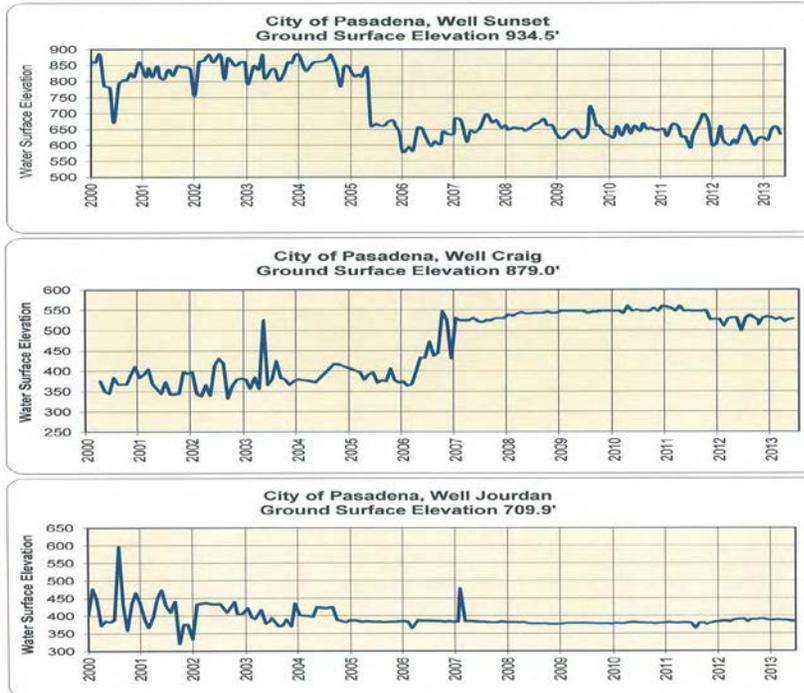
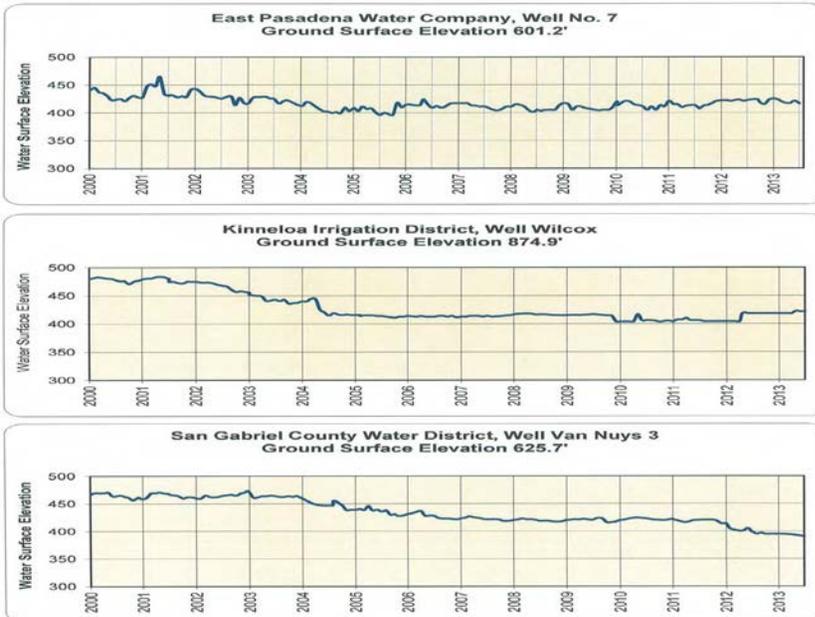


FIGURE 10b - FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA



SOURCE: Raymond Basin Management Board Annual Report, September 2013

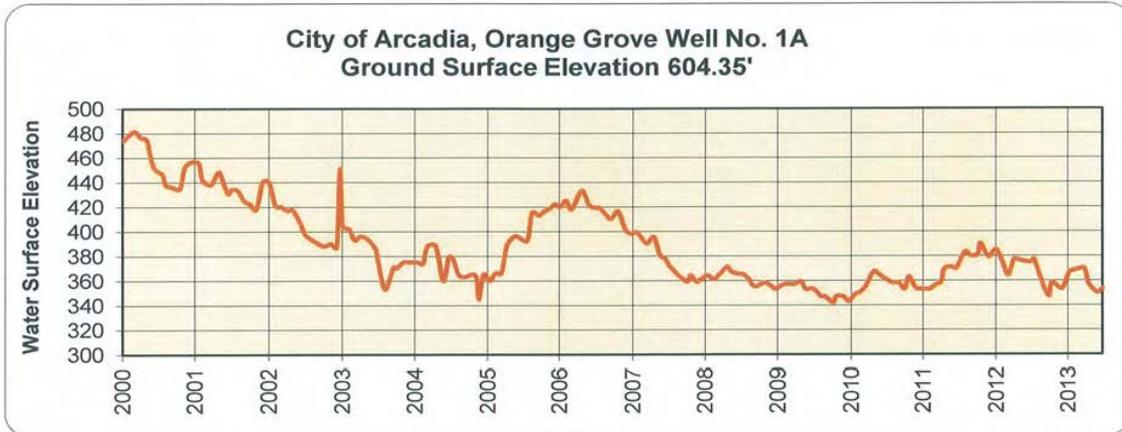


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KEY WELLS ELEVATION HYDROGRAPHS  
(PASADENA SUBAREA)

FIGURE 11 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE SANTA ANITA SUBAREA



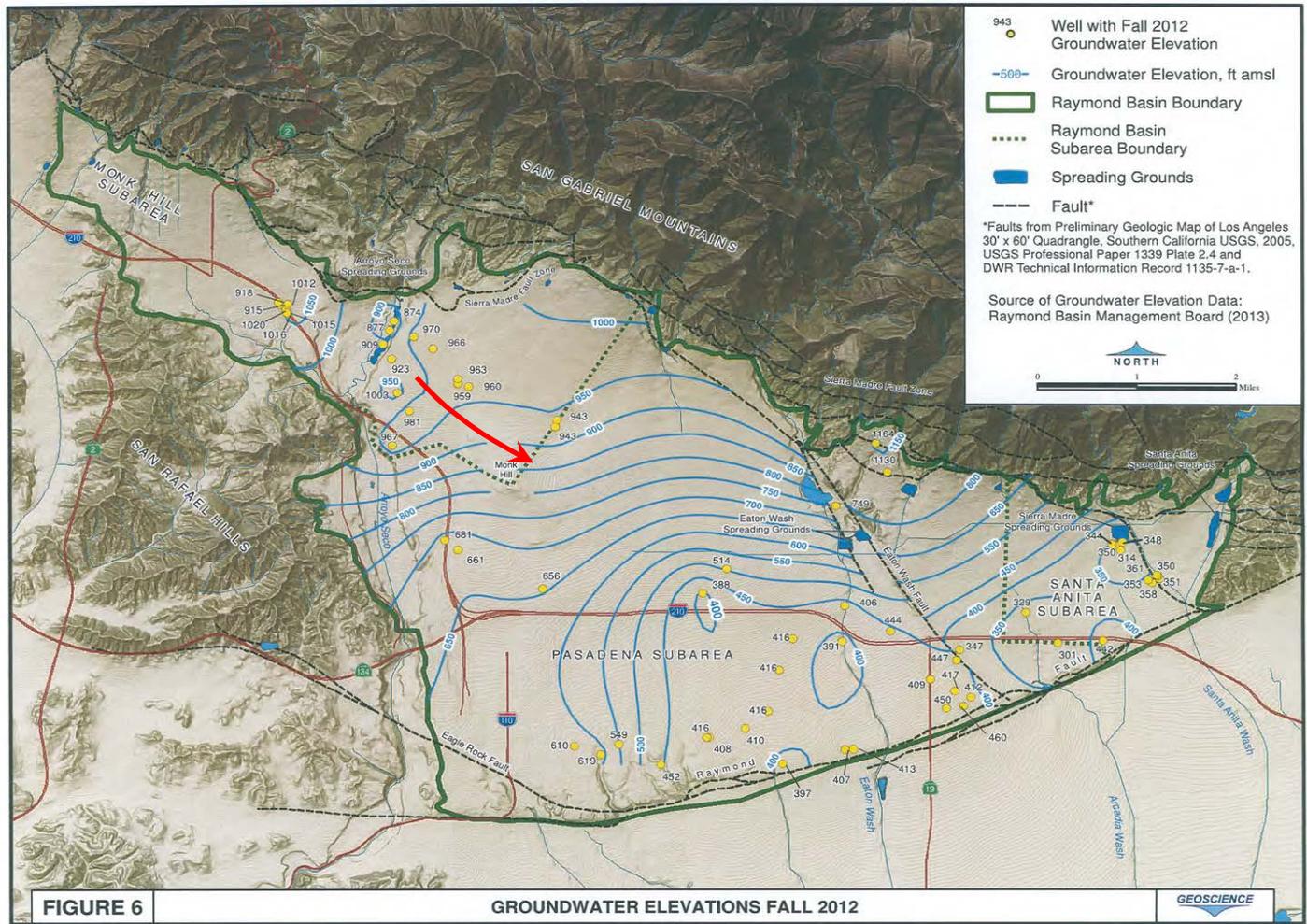
SOURCE: Raymond Basin Management Board Annual Report, September 2013



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KEY WELLS ELEVATION HYDROGRAPHS  
(SANTA ANITA SUBAREA)



Groundwater Flow Direction

Source: Annual Report July 1, 2012 - June 30, 2013. Raymond Basin Management Board. September 2013.

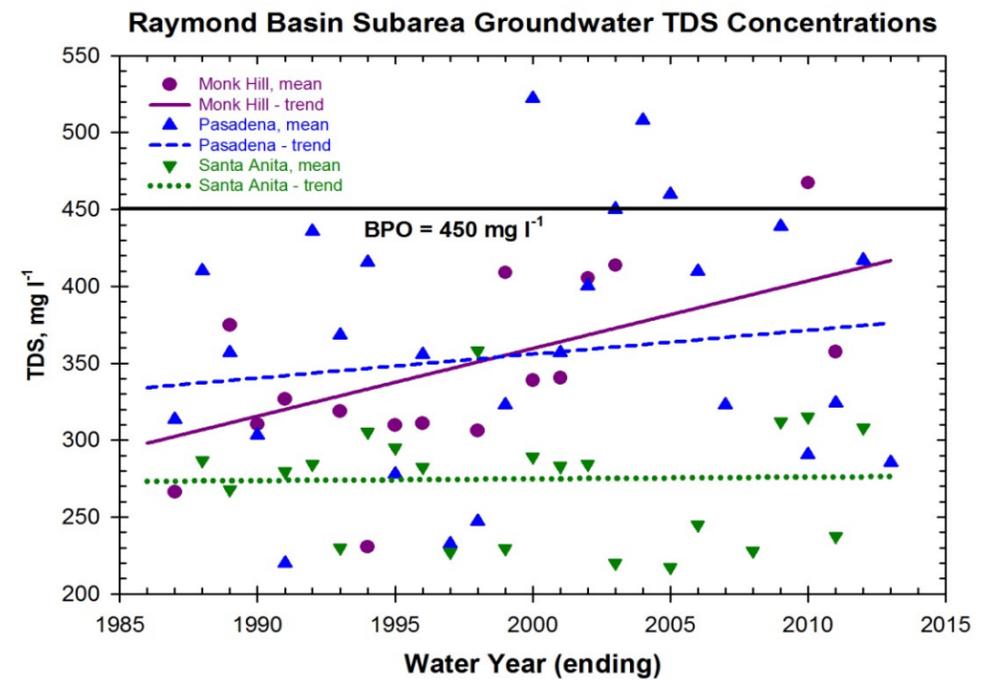
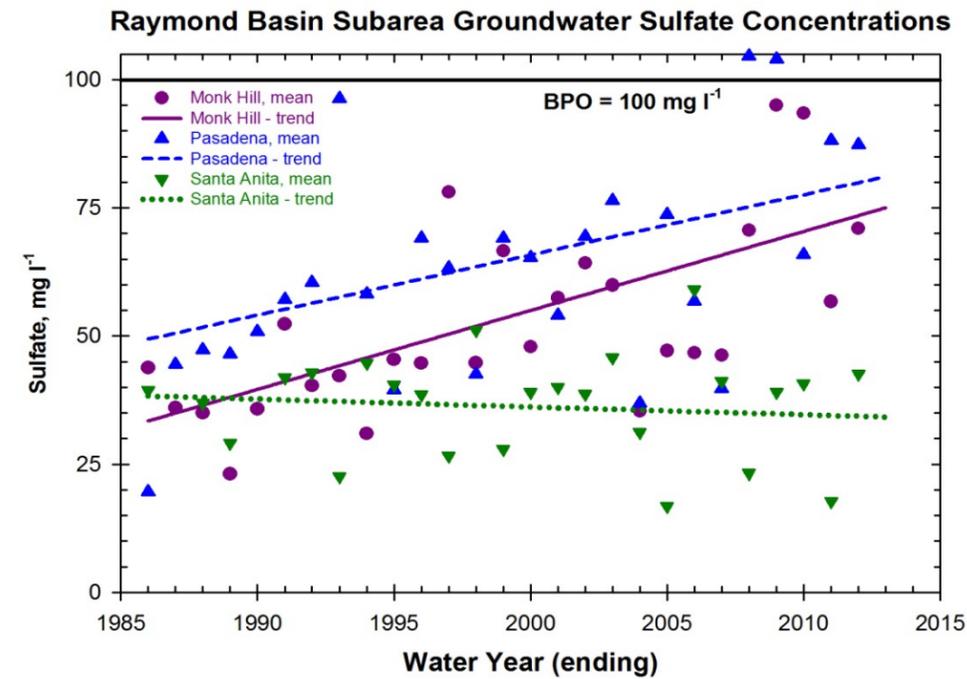
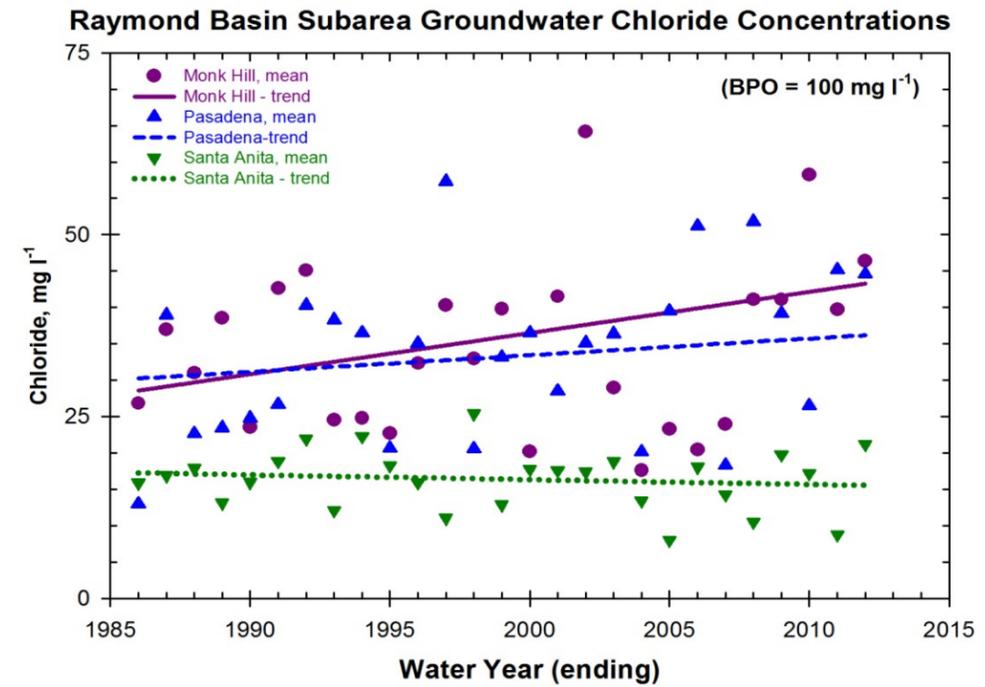
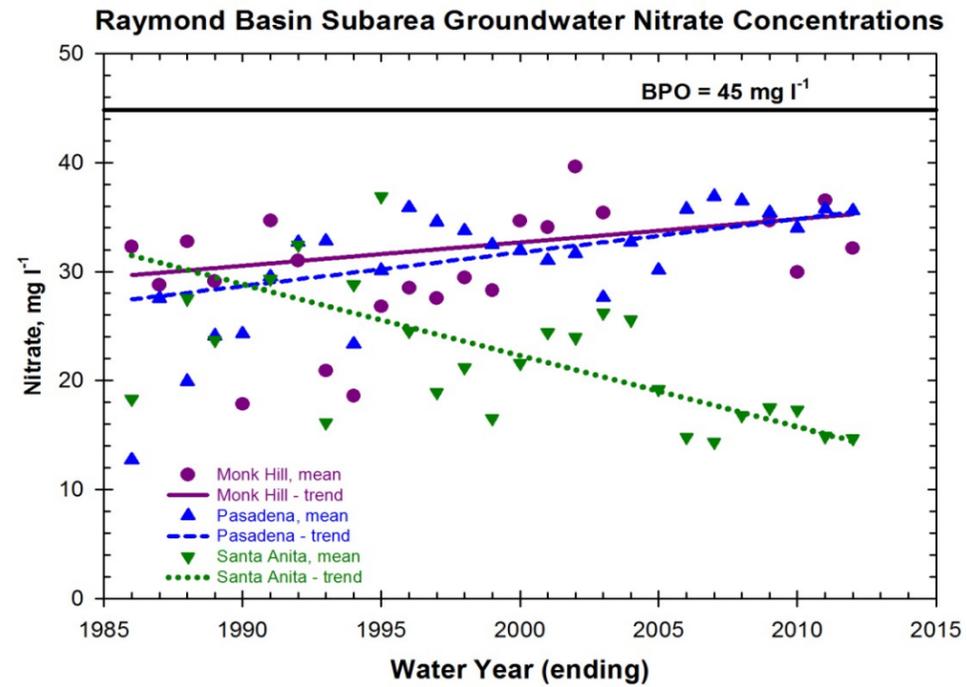


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GROUNDWATER FLOW DIRECTION IN RAYMOND BASIN - FALL 2012





(compiled from Table III.4 and Appendices J and K.)

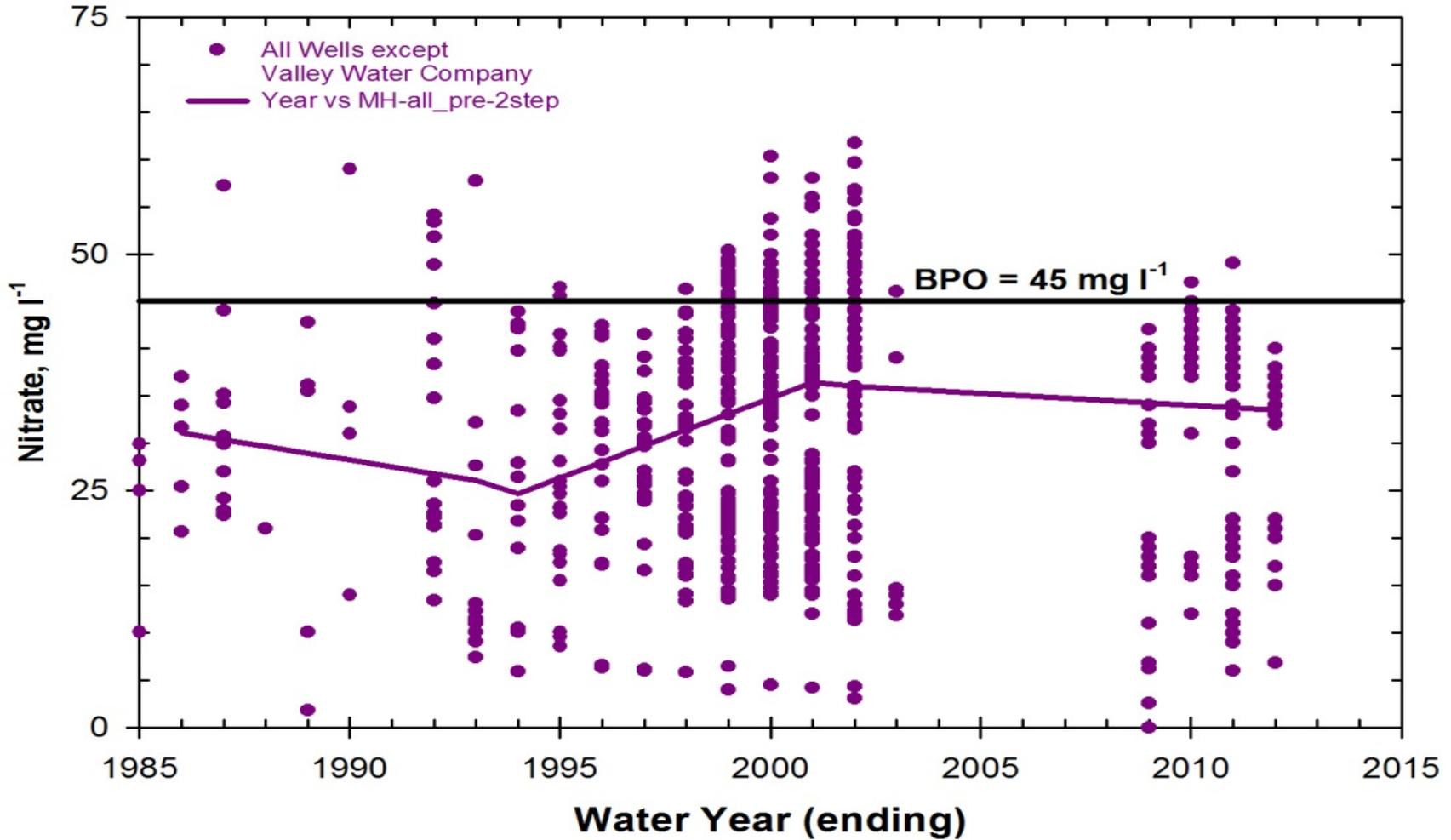


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RAYMOND BASIN MEAN ANNUAL GROUNDWATER QUALITY CHARACTERISTICS BY SUBAREA

## Monk Hill Groundwater Nitrate Concentrations



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

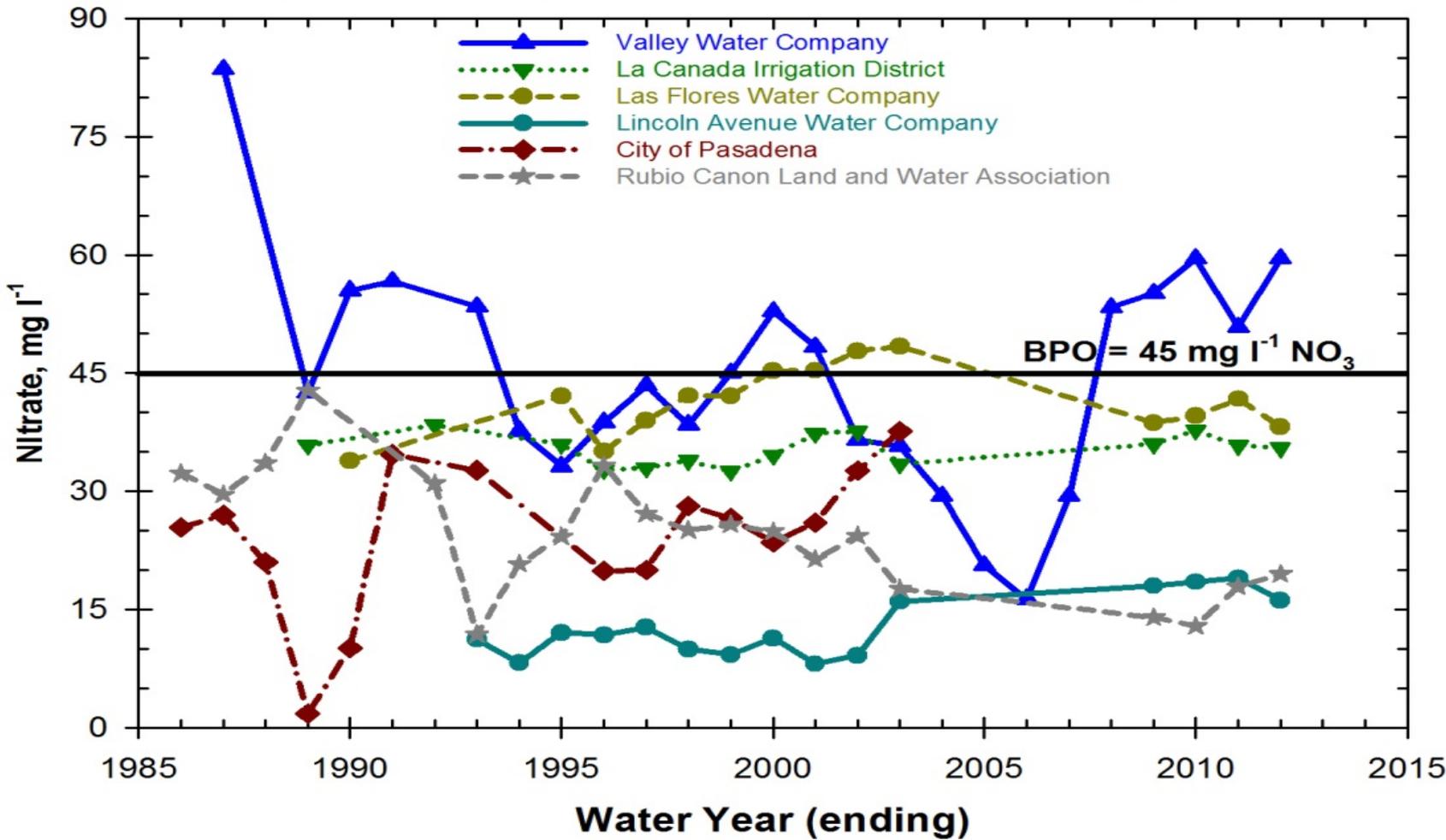


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MONK HILL SUBAREA NITRATE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Monk Hill Subarea Nitrate Concentrations by District



(compiled from Appendices J and K.) BPO is the Basin Water Quality Plan Objective

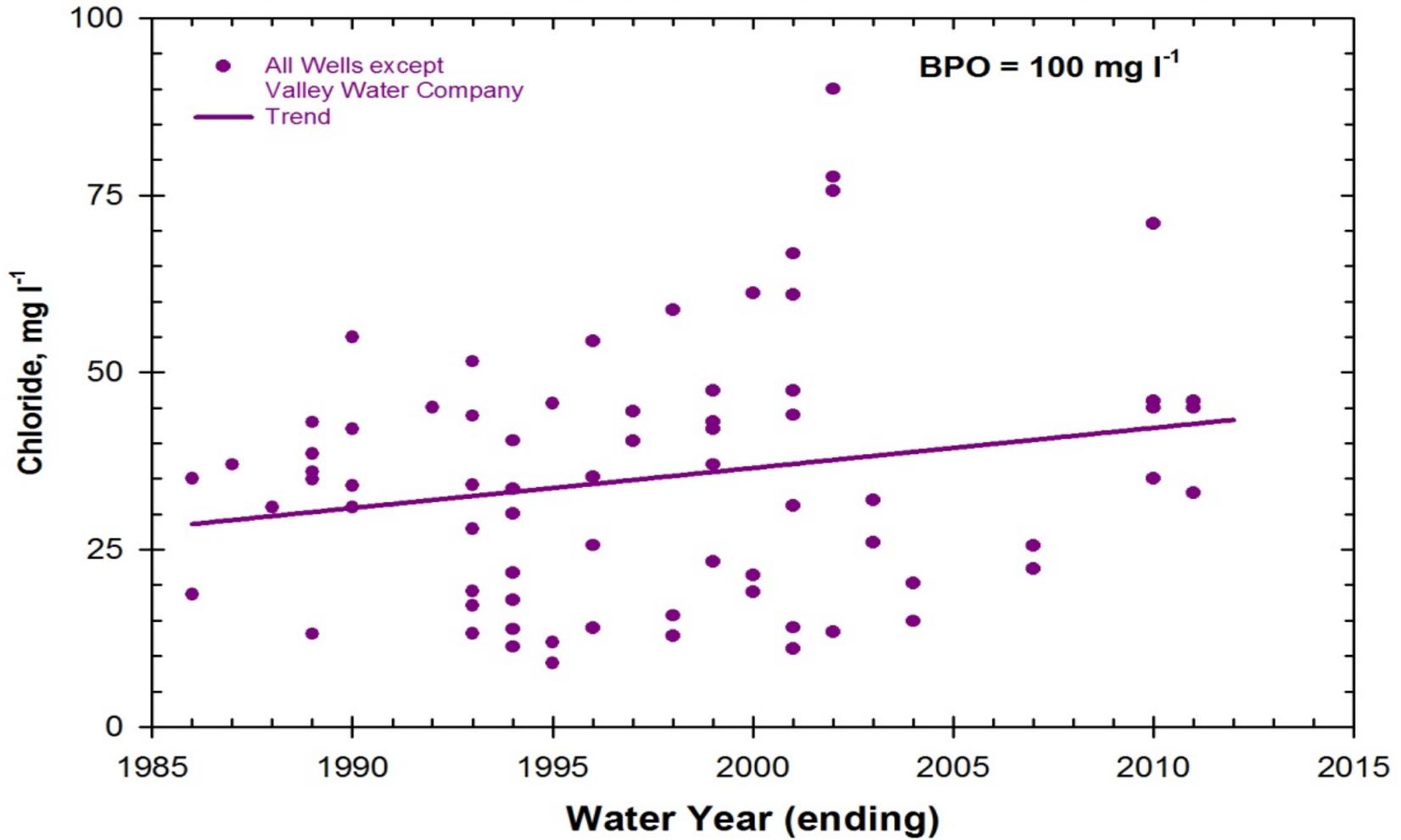


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MONK HILL SUBAREA NITRATE GROUNDWATER QUALITY  
 CHARACTERISTICS BY PURVEYOR

## Monk Hill Groundwater Chloride Concentrations



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

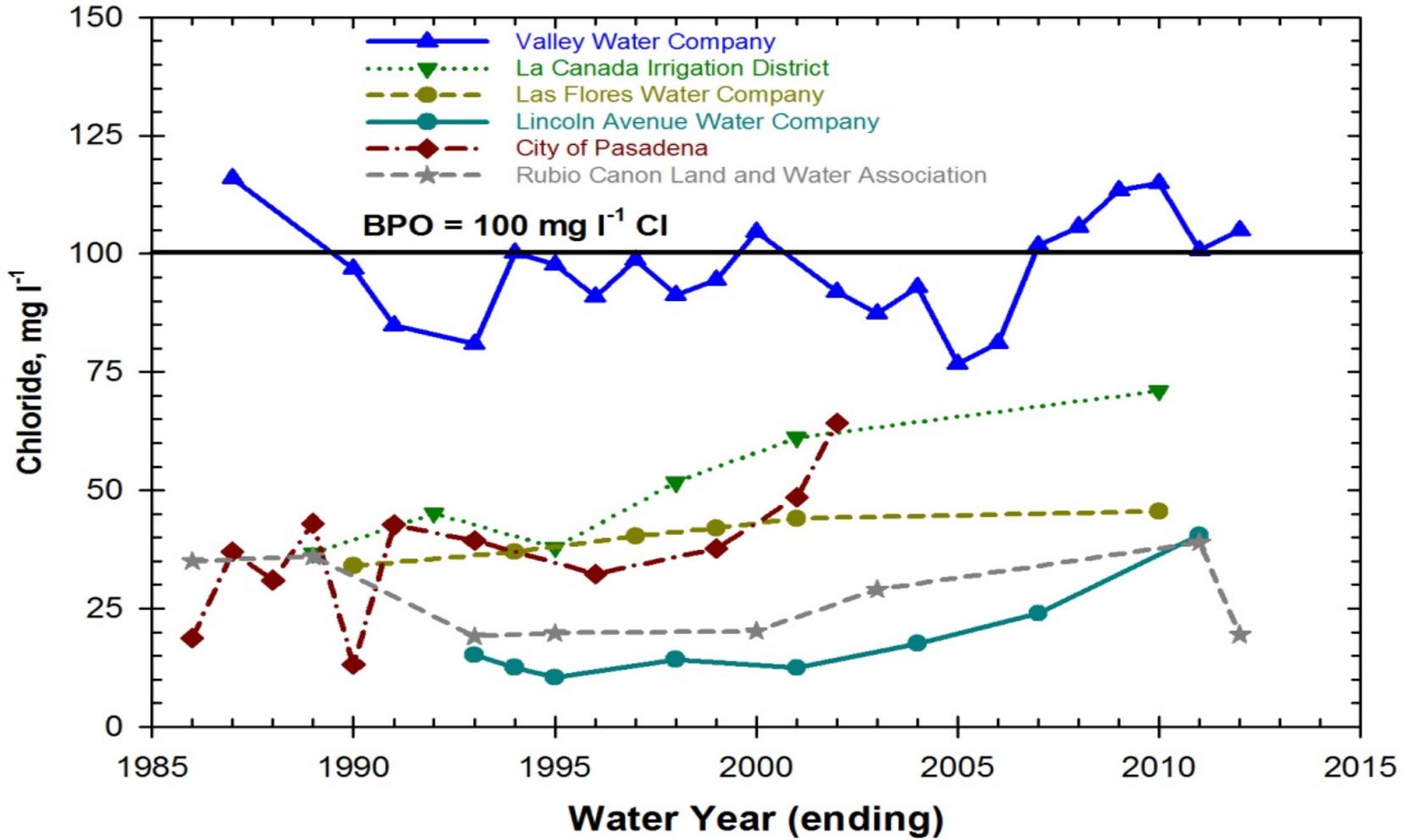


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MONK HILL SUBAREA CHLORIDE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Monk Hill Subarea Chloride Concentrations by District



(compiled from Appendices J and K) BPO is the Basin Water Quality Plan Objective

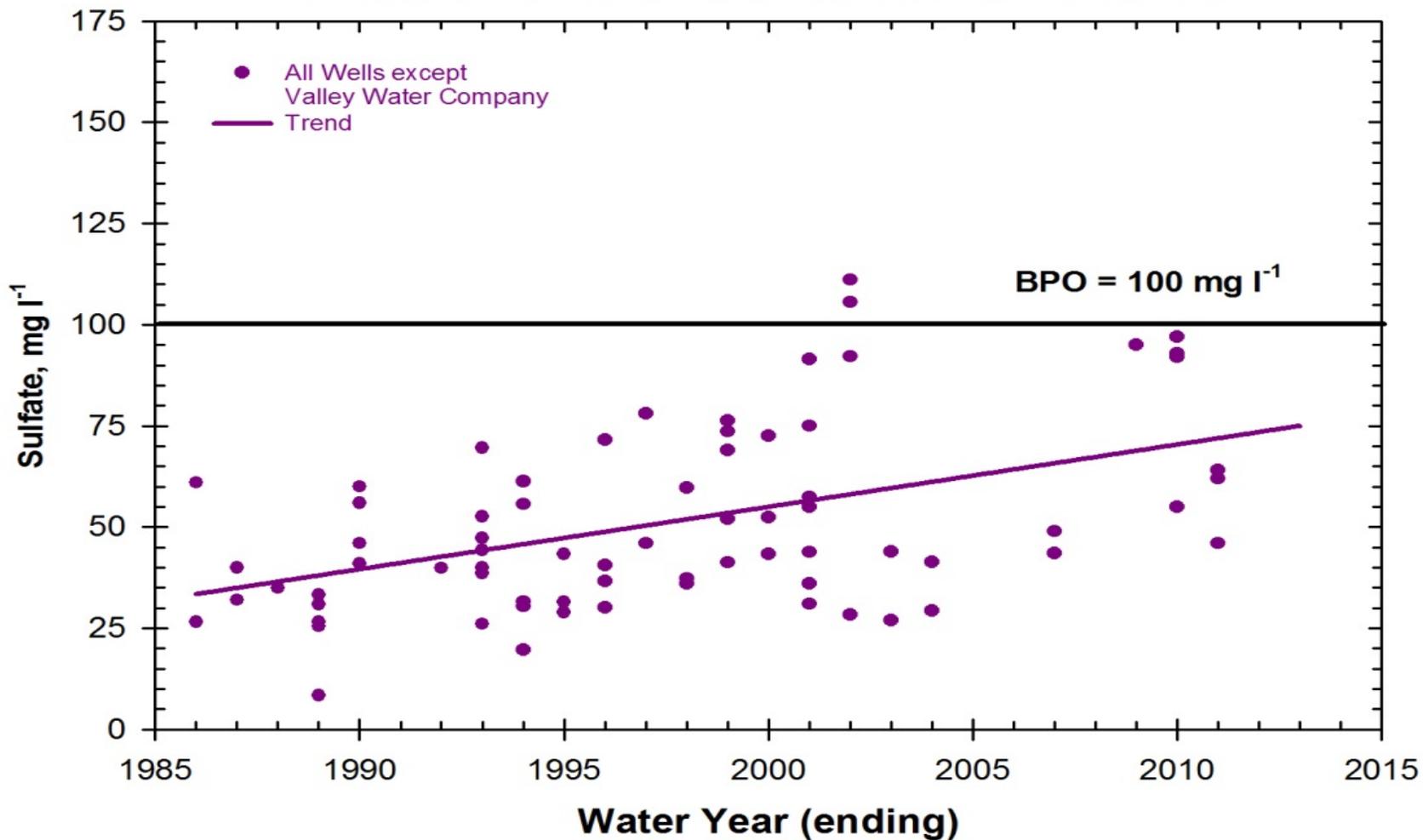


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MONK HILL SUBAREA CHLORIDE GROUNDWATER QUALITY  
 CHARACTERISTICS BY PURVEYOR

## Monk Hill Groundwater Sulfate Concentrations



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

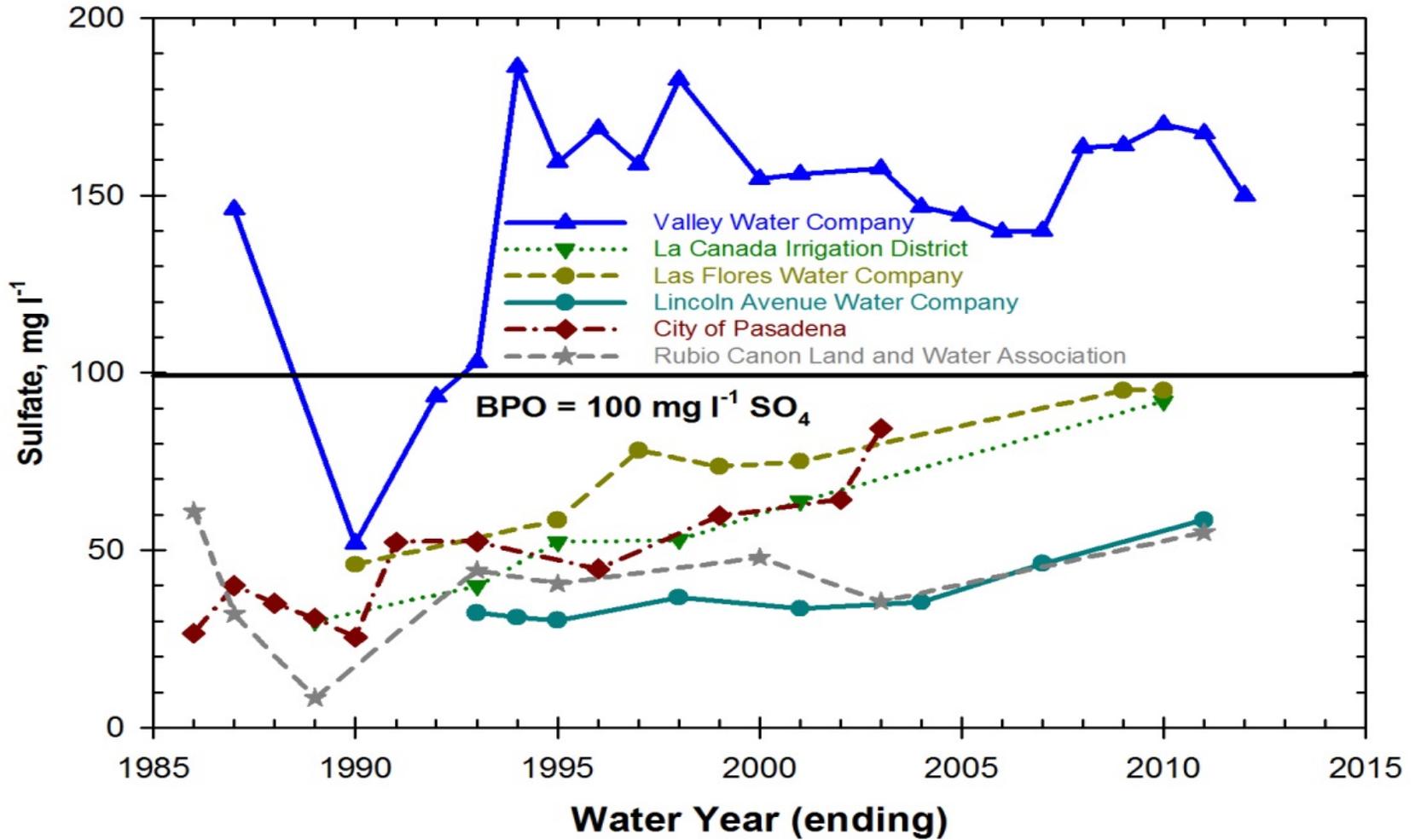


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MONK HILL SUBAREA SULFATE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Monk Hill Subarea Sulfate Concentrations by District



(compiled from Appendices J and K) BPO is the Basin Water Quality Plan Objective

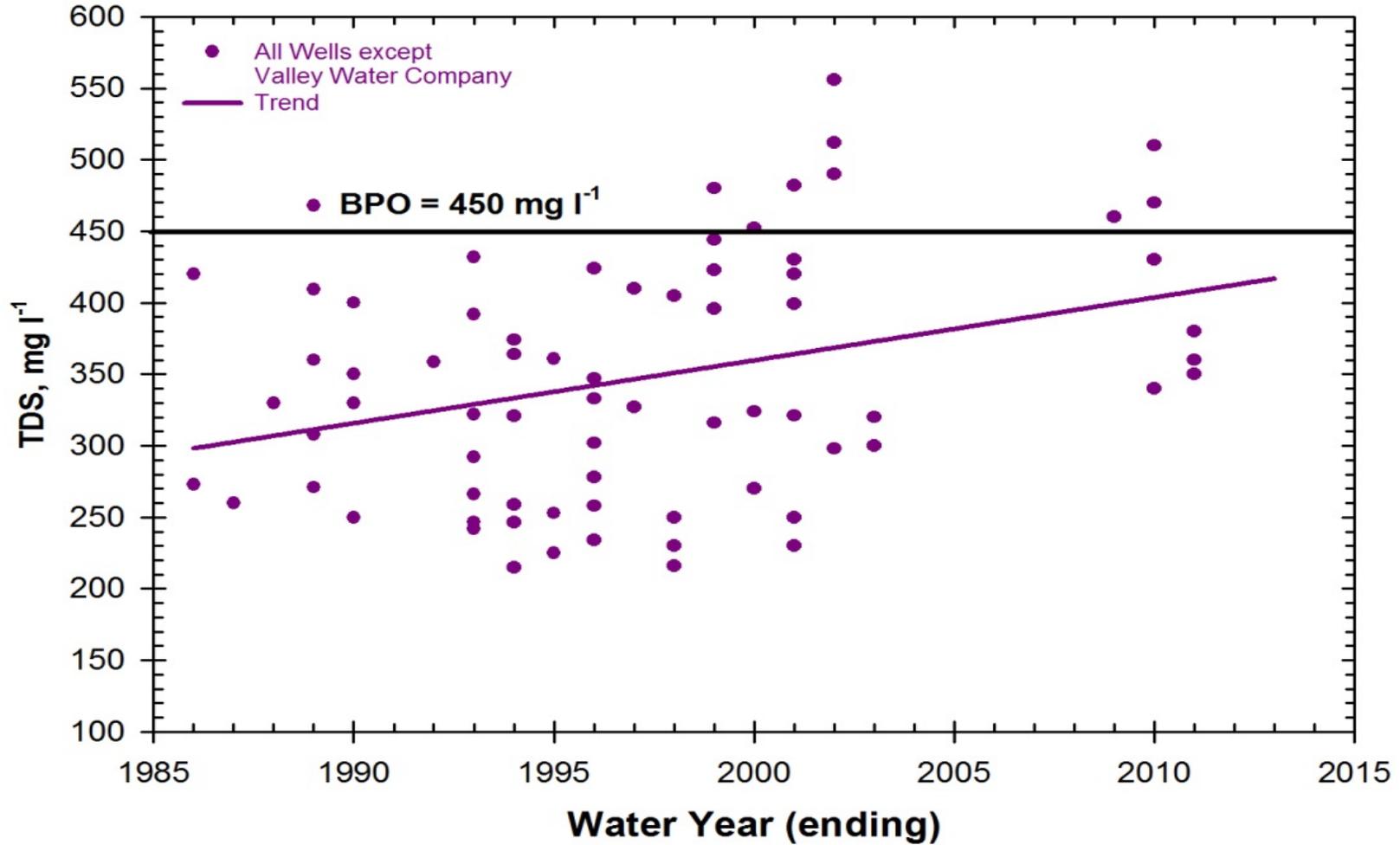


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MONK HILL SUBAREA SULFATE GROUNDWATER QUALITY  
 CHARACTERISTICS BY PURVEYOR

## Monk Hill Groundwater TDS Concentrations



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

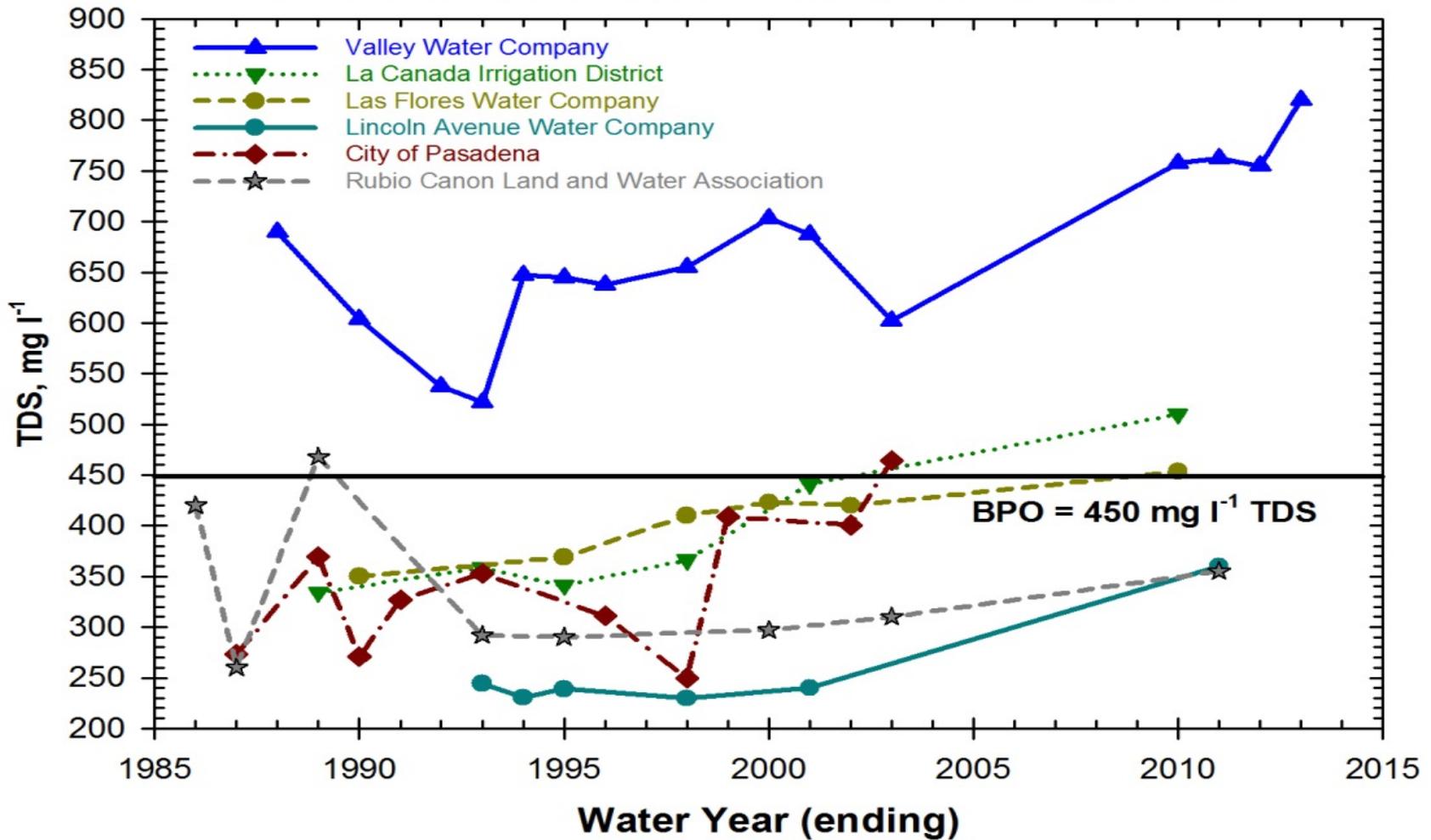


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MONK HILL SUBAREA TOTAL DISSOLVED SOLIDS (TDS) GROUNDWATER  
 QUALITY CHARACTERISTICS

## Monk Hill Subarea TDS Concentrations by District



(compiled from Appendices J and K) BPO is the Basin Water Quality Plan Objective

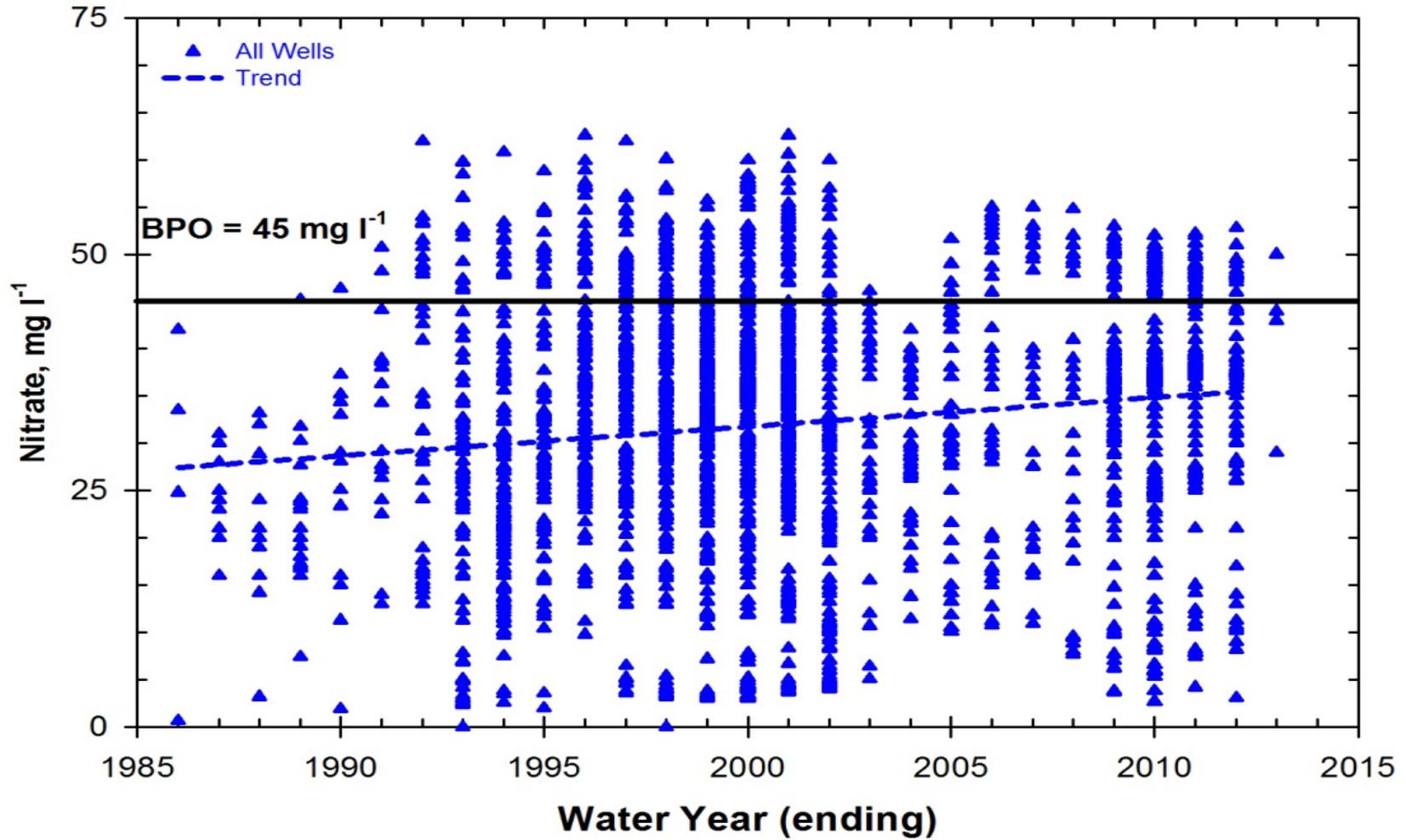


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### RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SUBAREA TOTAL DISSOLVED SOLIDS (TDS) GROUNDWATER  
QUALITY CHARACTERISTICS BY PURVEYOR

## Pasadena Groundwater Nitrate Concentrations



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

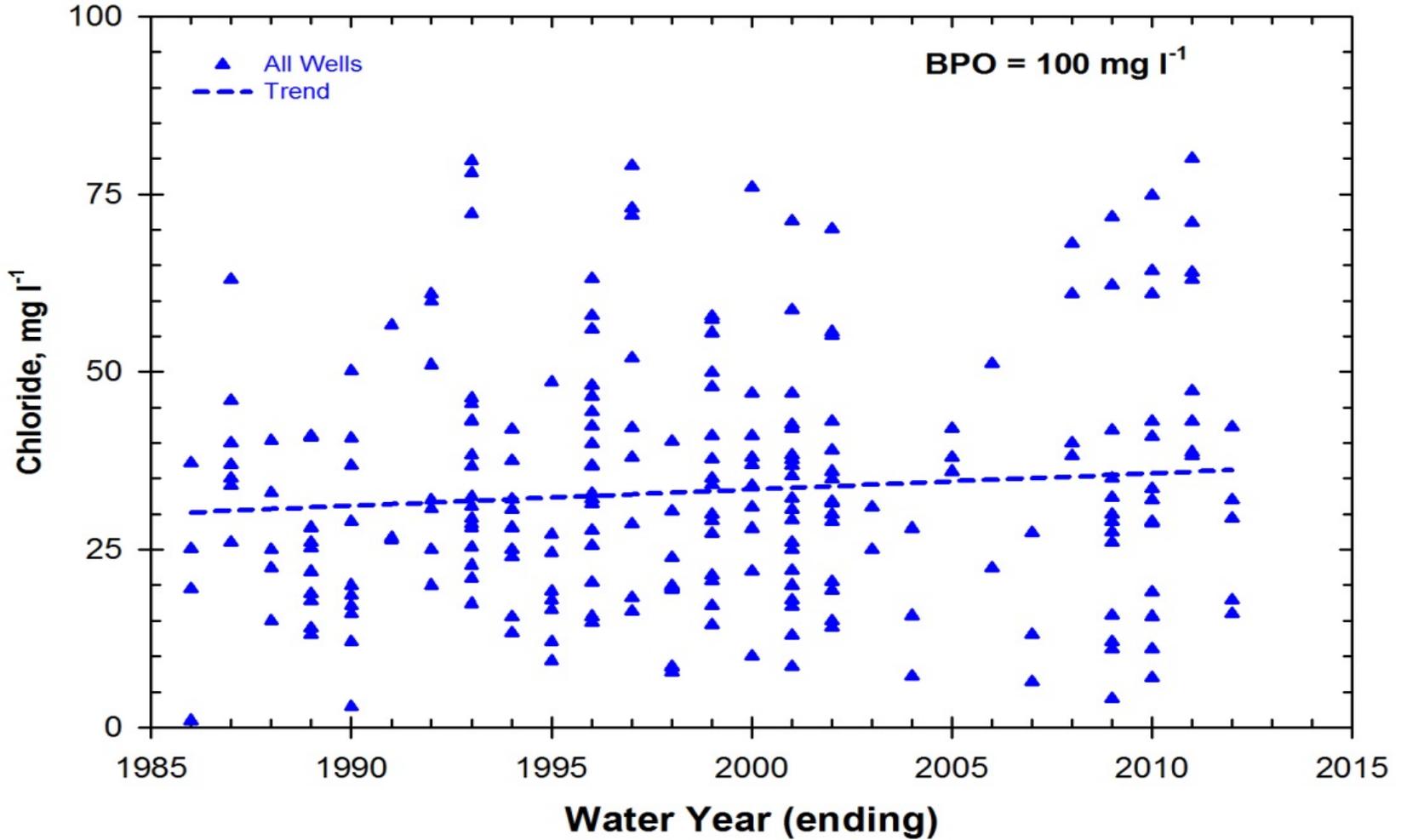


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PASADENA SUBAREA NITRATE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Pasadena Groundwater Chloride Concentrations



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

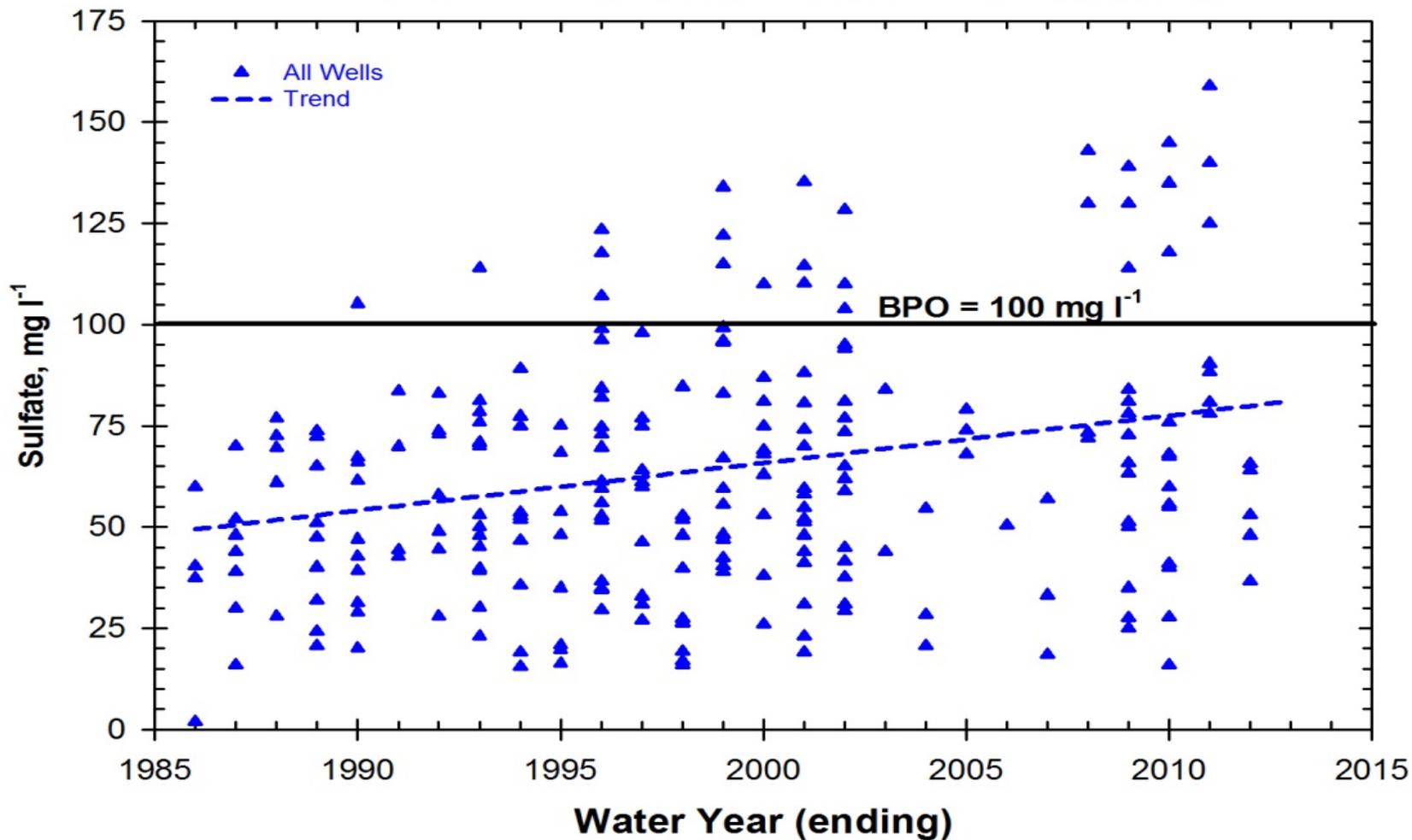


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PASADENA SUBAREA CHLORIDE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Pasadena Groundwater Sulfate Concentrations



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

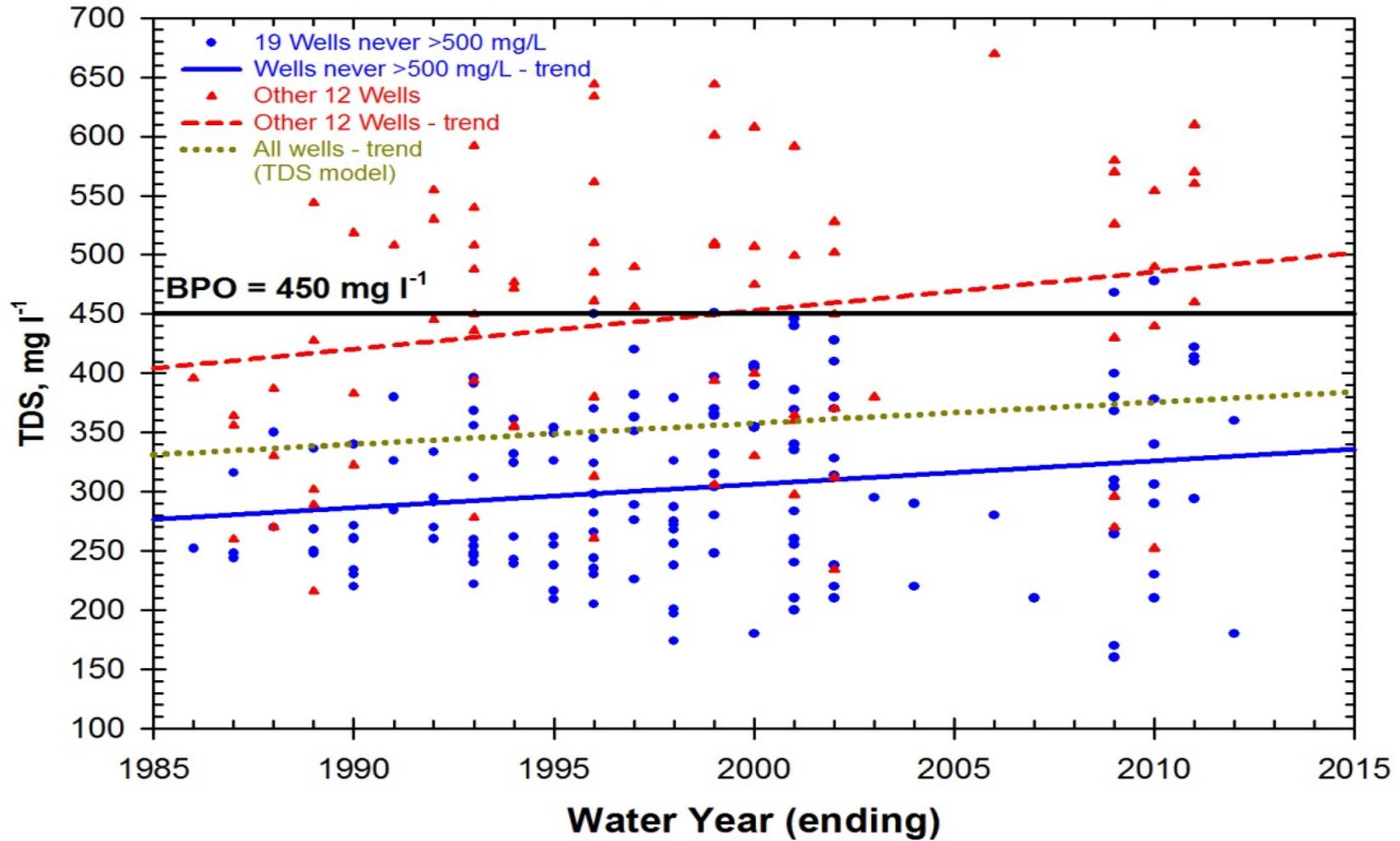


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PASADENA SUBAREA SULFATE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Pasadena Groundwater TDS Concentrations



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

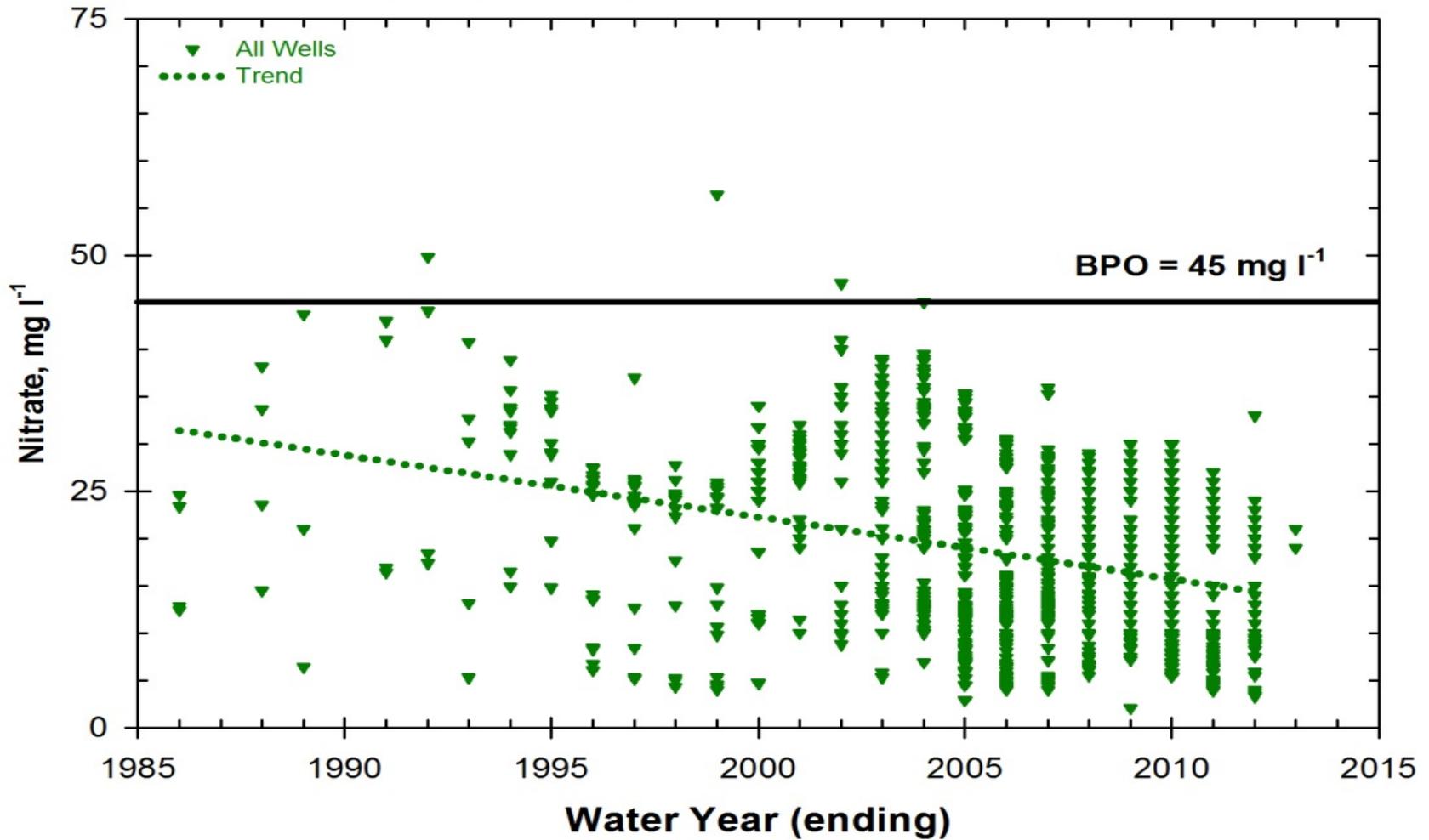


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PASADENA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) GROUNDWATER  
 QUALITY CHARACTERISTICS

## Santa Anita Groundwater Nitrate Concentrations



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

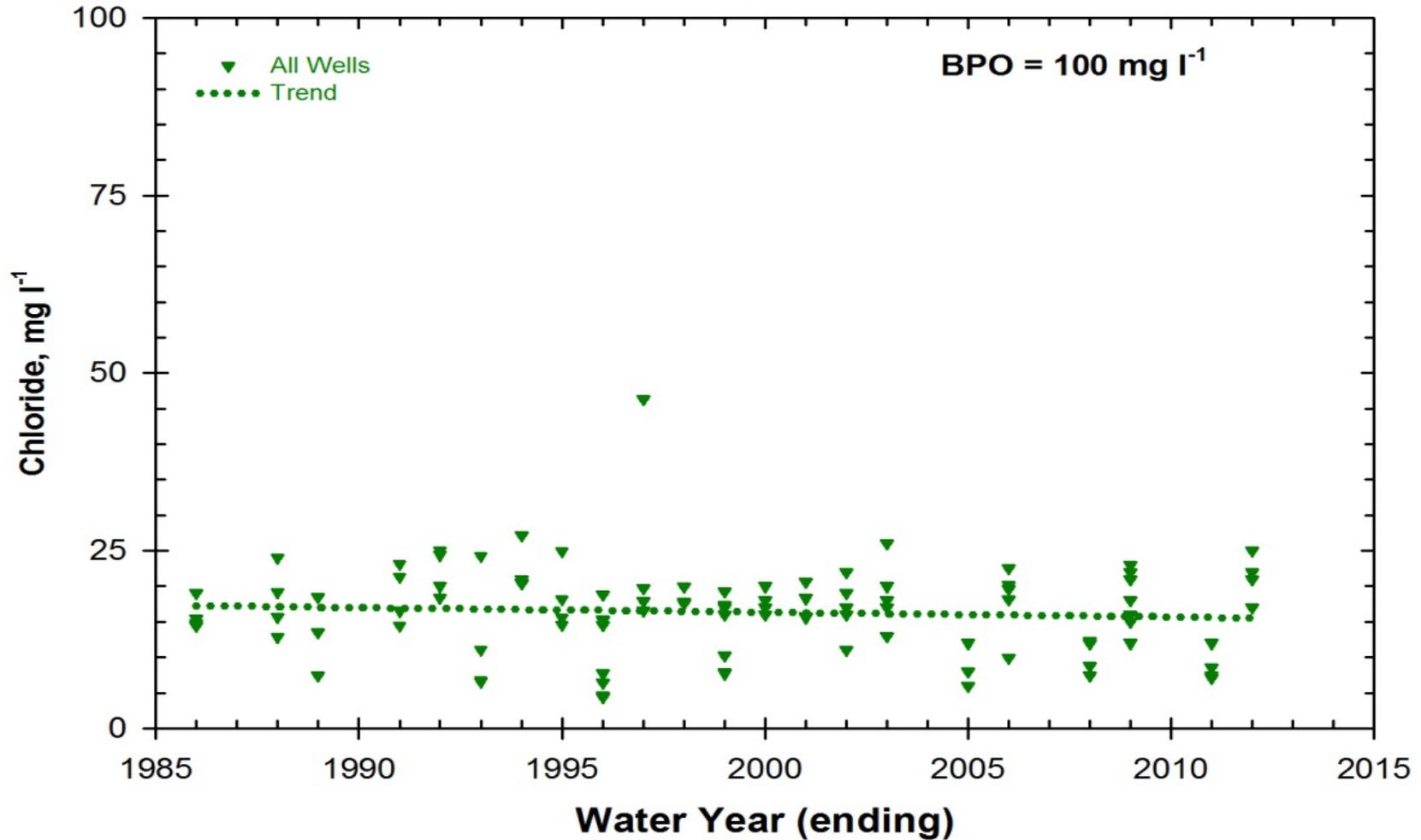


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SANTA ANITA SUBAREA NITRATE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Santa Anita Groundwater Chloride Concentrations



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

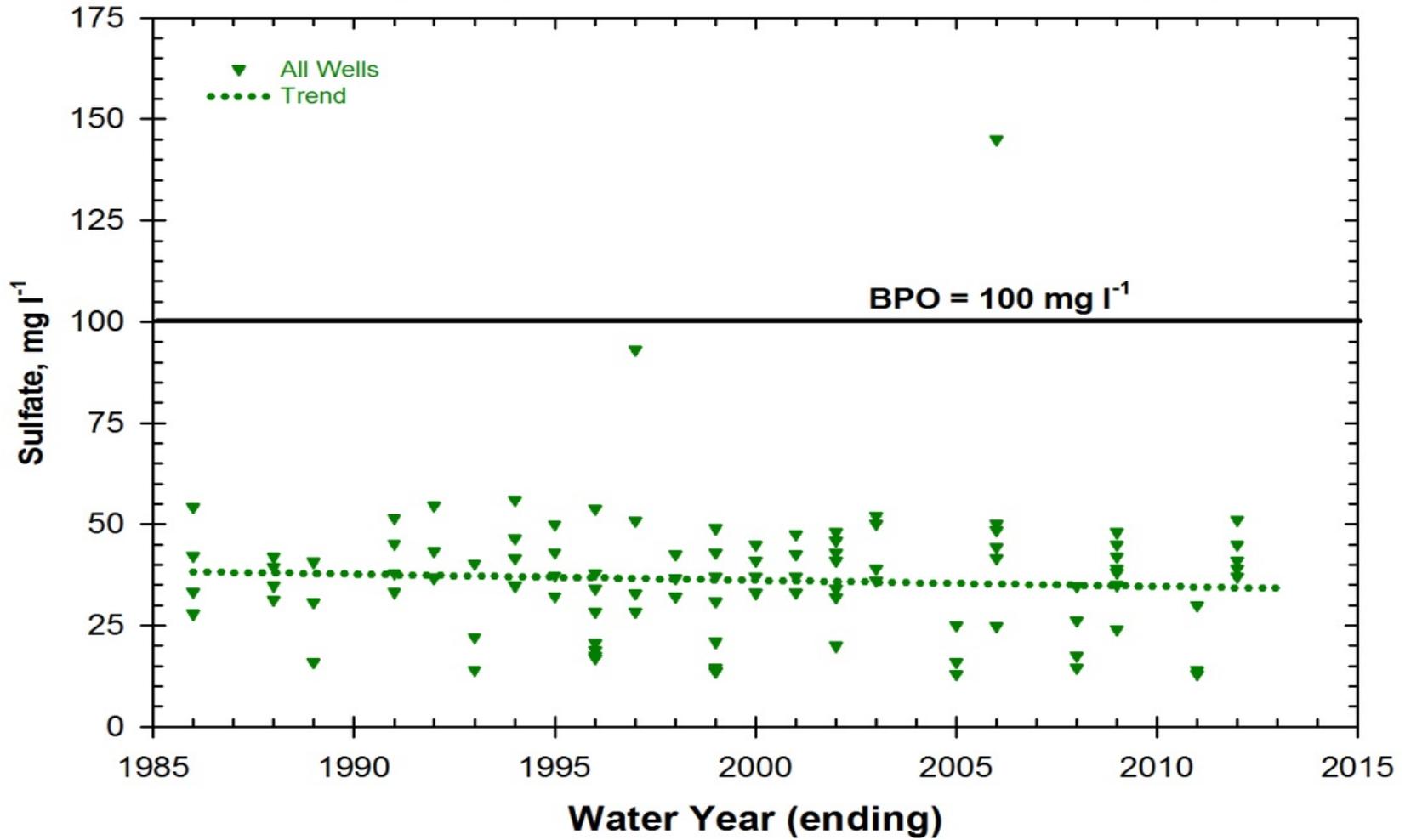


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SANTA ANITA SUBAREA CHLORIDE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Santa Anita Groundwater Sulfate Concentrations



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

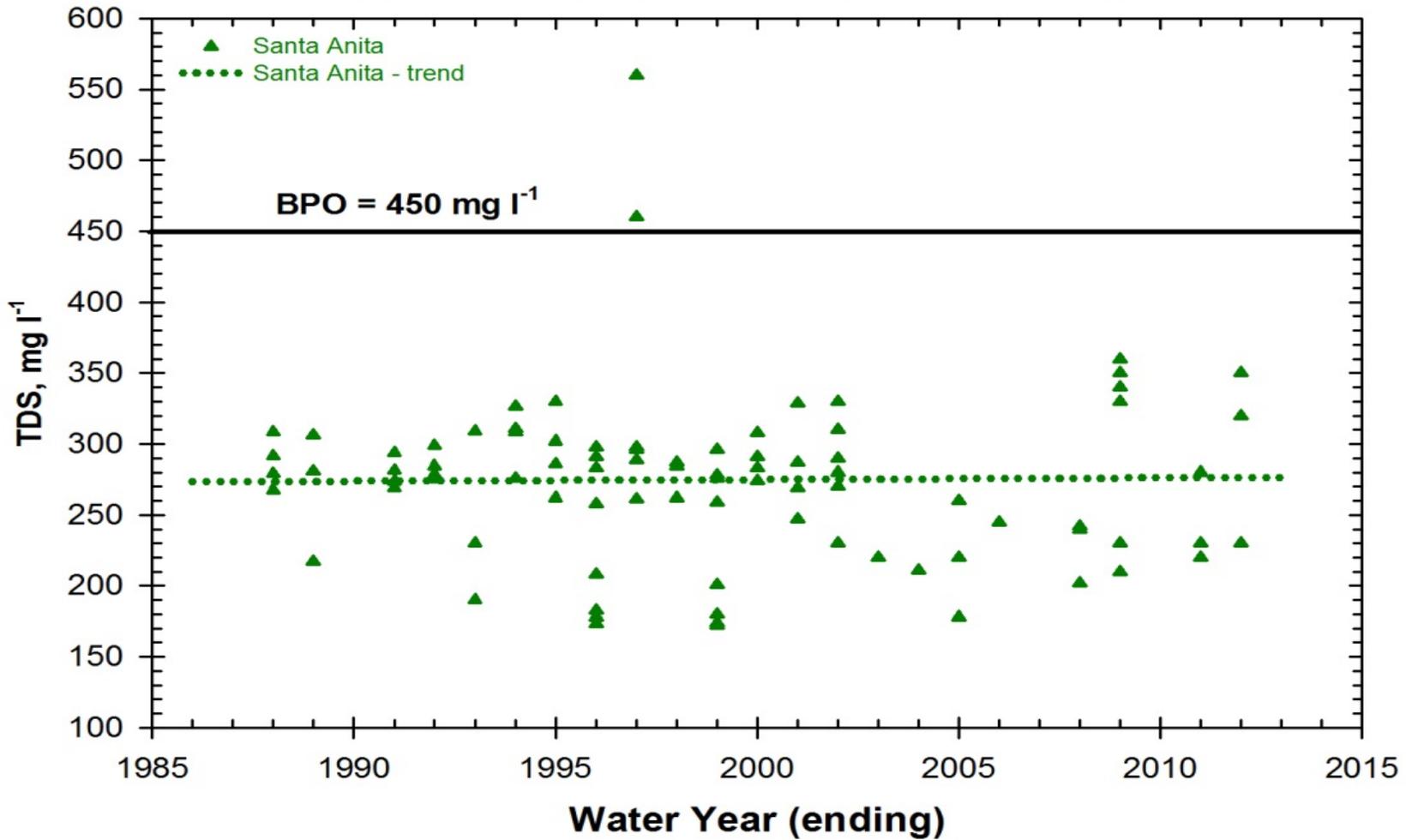


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SANTA ANITA SUBAREA SULFATE GROUNDWATER QUALITY  
 CHARACTERISTICS

## Santa Anita Groundwater TDS Concentrations



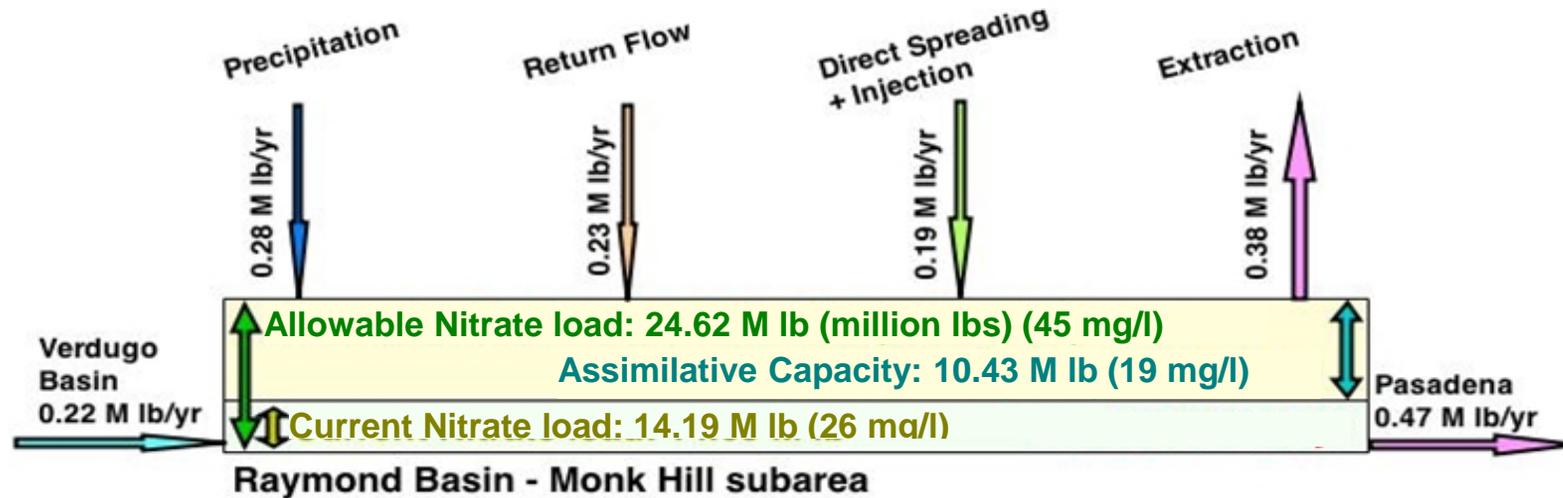
(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective



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SANTA ANITA SUBAREA TOTAL DISSOLVED SOLIDS (TDS)  
 GROUNDWATER QUALITY CHARACTERISTICS



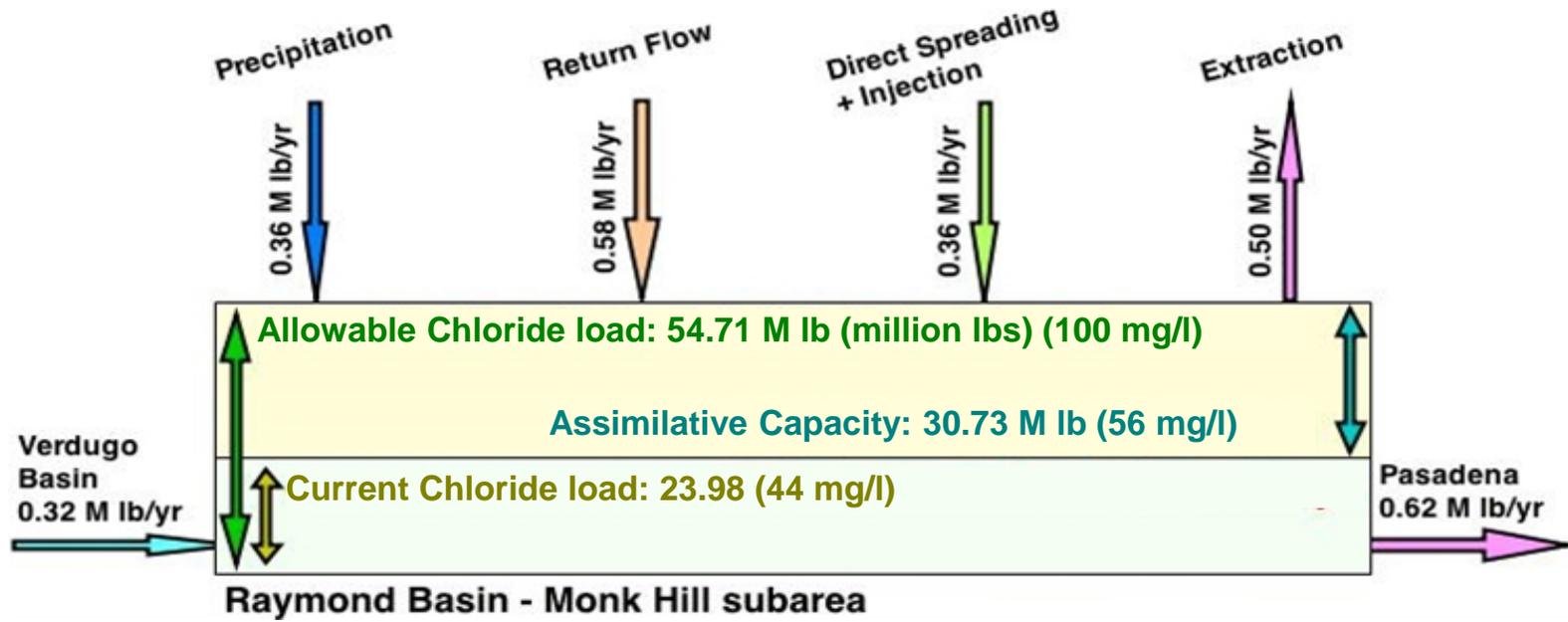
(compiled from Tables III.6 through III.9 and Appendix G)



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MONK HILL SUBAREA NITRATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



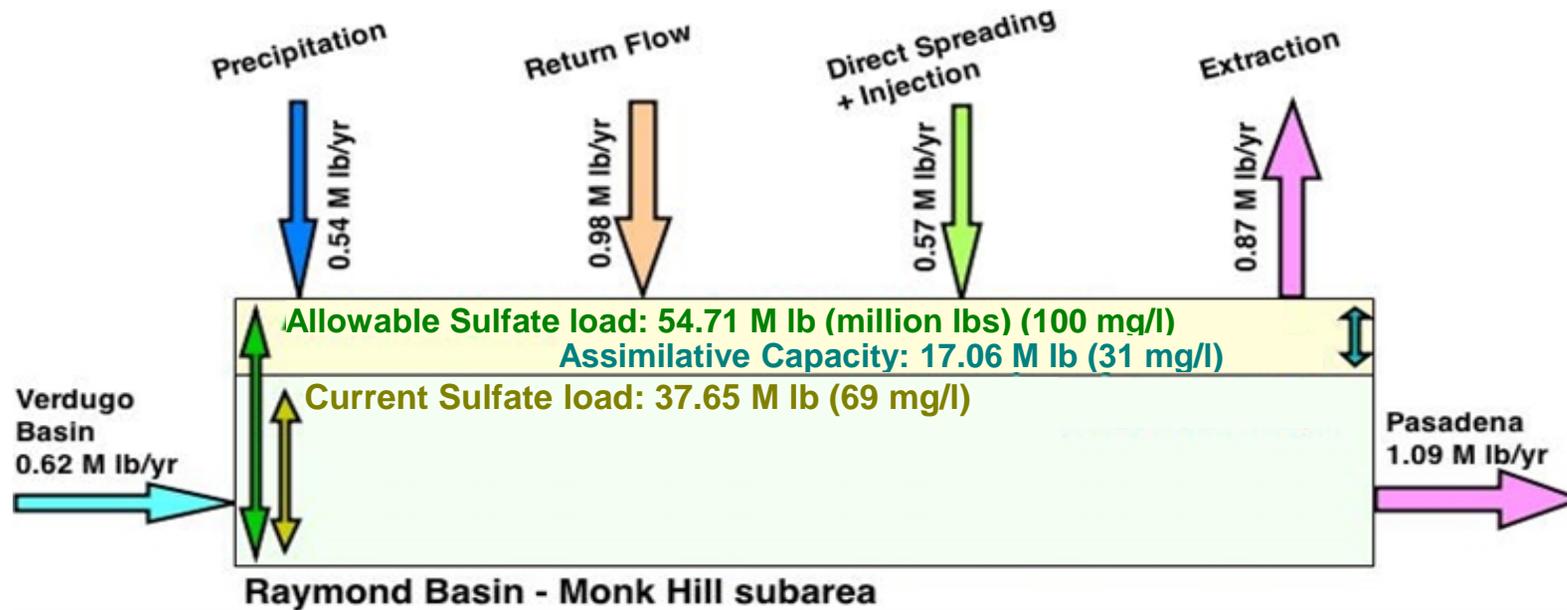
(compiled from Tables III.6 through III.9 and Appendix G)



**STETSON ENGINEERS INC.**  
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WATER RESOURCE ENGINEERS

**RAYMOND BASIN MANAGEMENT BOARD**

MONK HILL SUBAREA CHLORIDE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



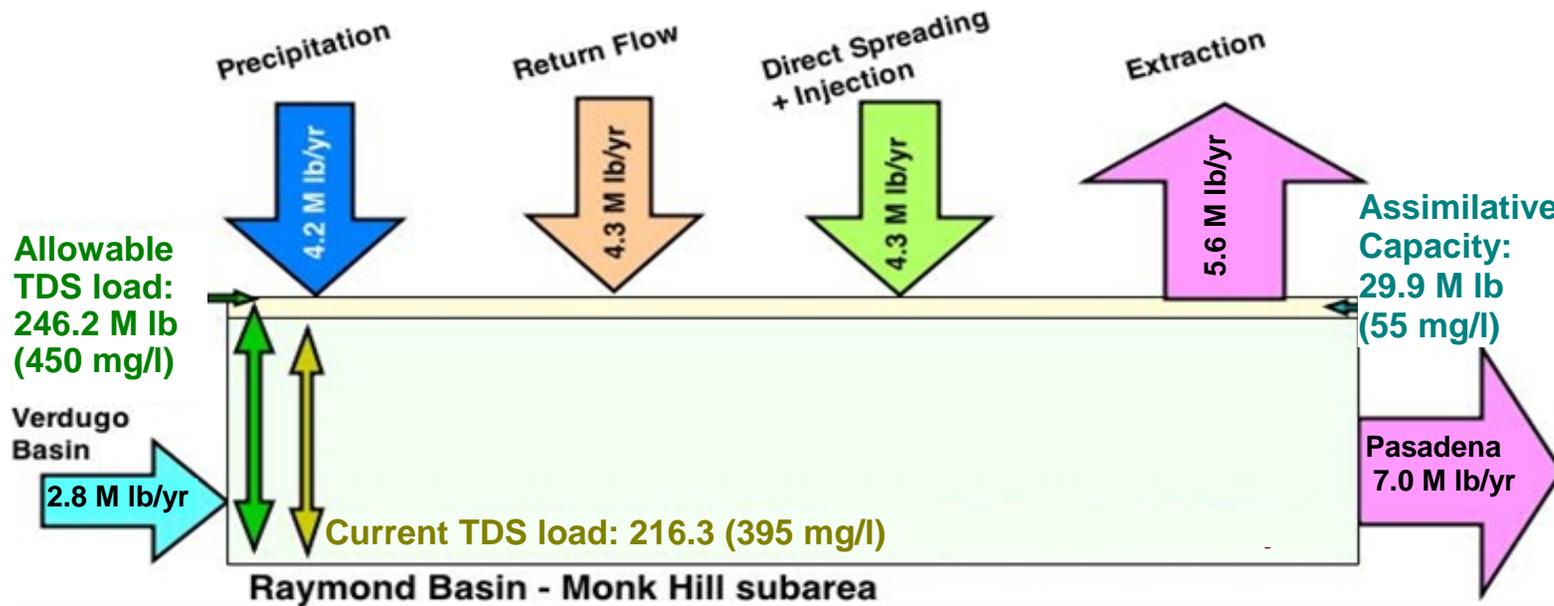
(compiled from Tables III.6 through III.9 and Appendix G)



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**RAYMOND BASIN MANAGEMENT BOARD**

MONK HILL SUBAREA SULFATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



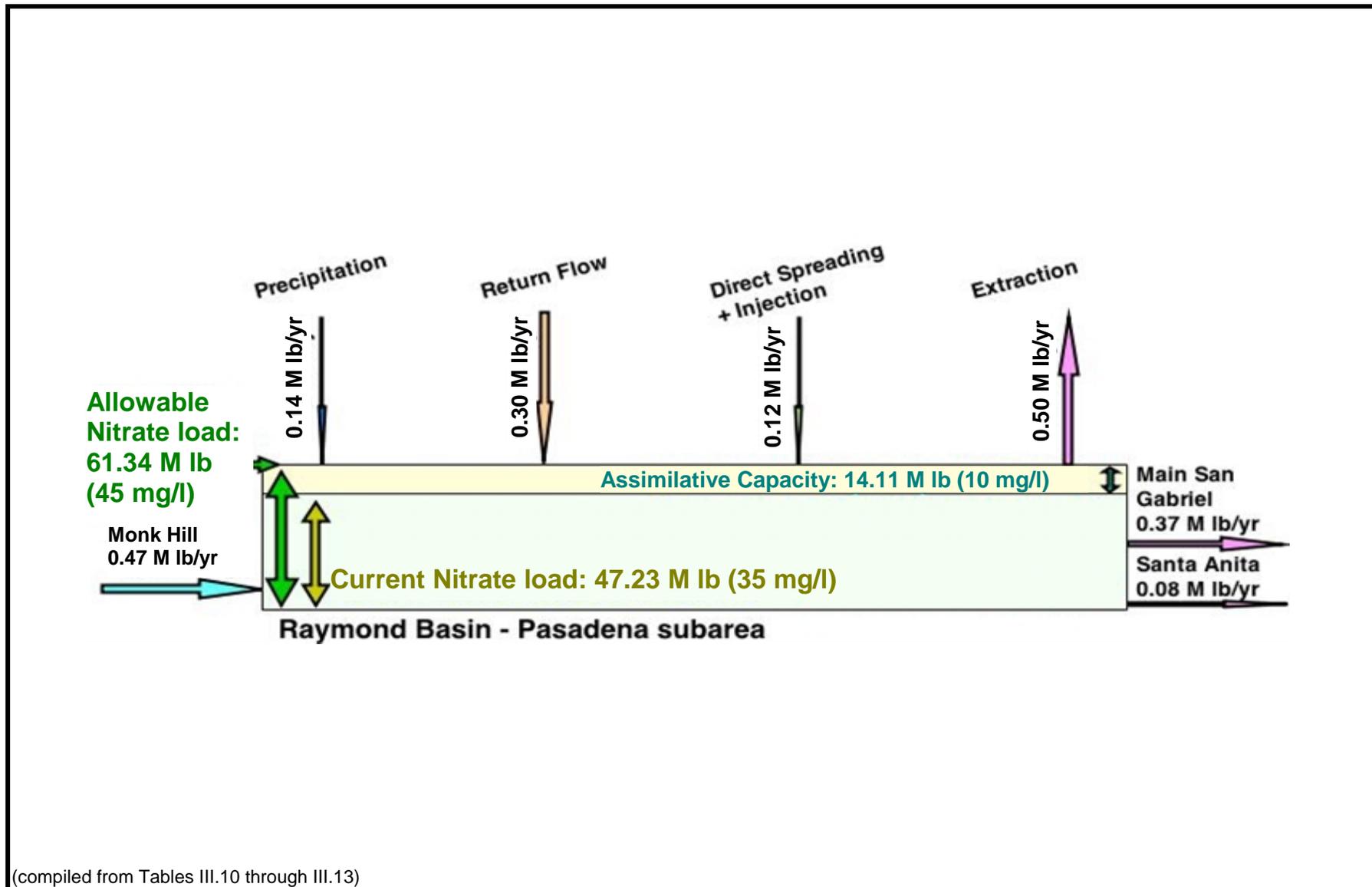
(compiled from Tables III.6 through III.9 and Appendix G)



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**RAYMOND BASIN MANAGEMENT BOARD**

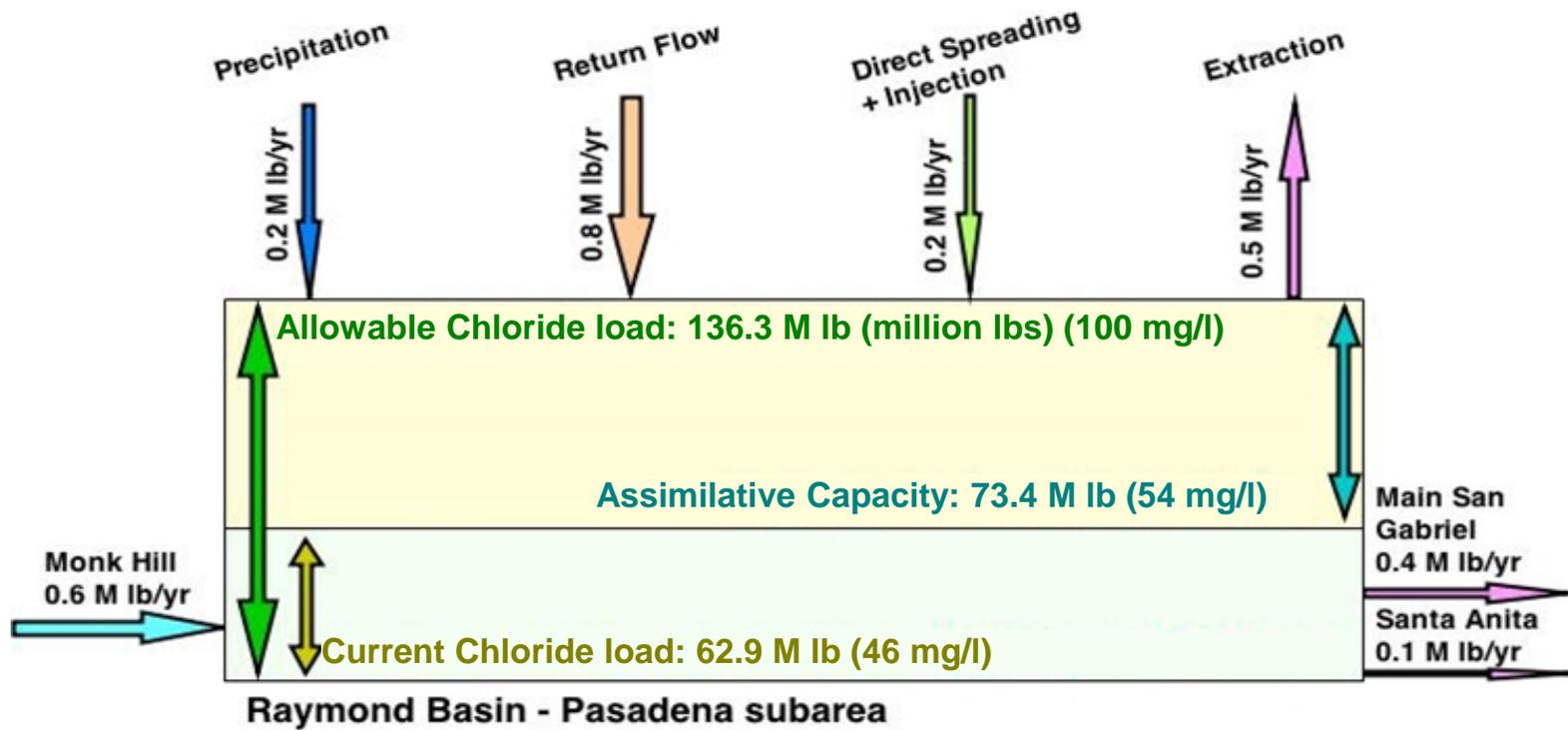
MONK HILL SUBAREA TOTAL DISSOLVED SOLIDS (TDS) LOADING /  
 UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA SUBAREA NITRATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



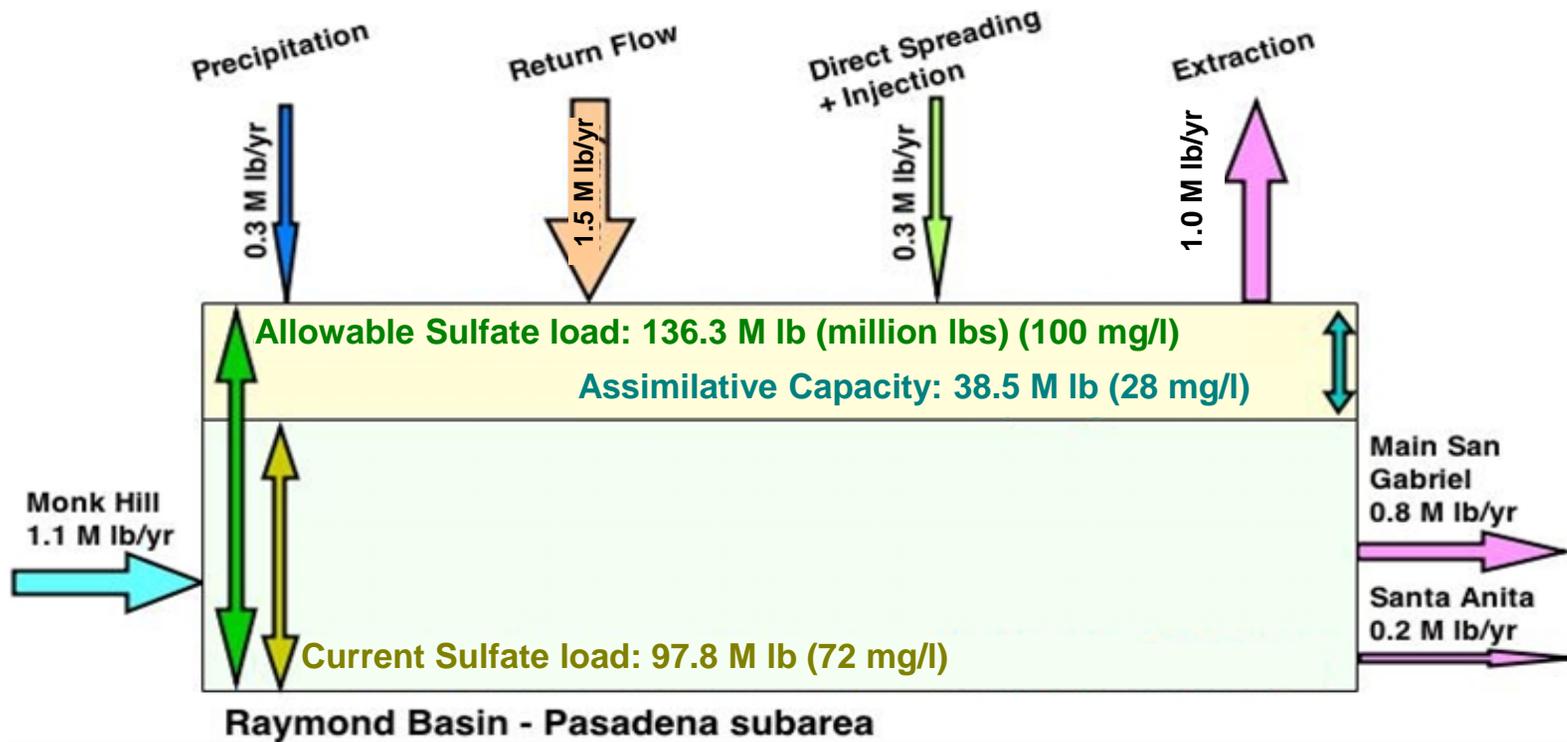
(compiled from Tables III.10 through III.13)



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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA SUBAREA CHLORIDE LOADING / UNLOADING BALANCE,  
 2002-2003 THROUGH 2011-2012



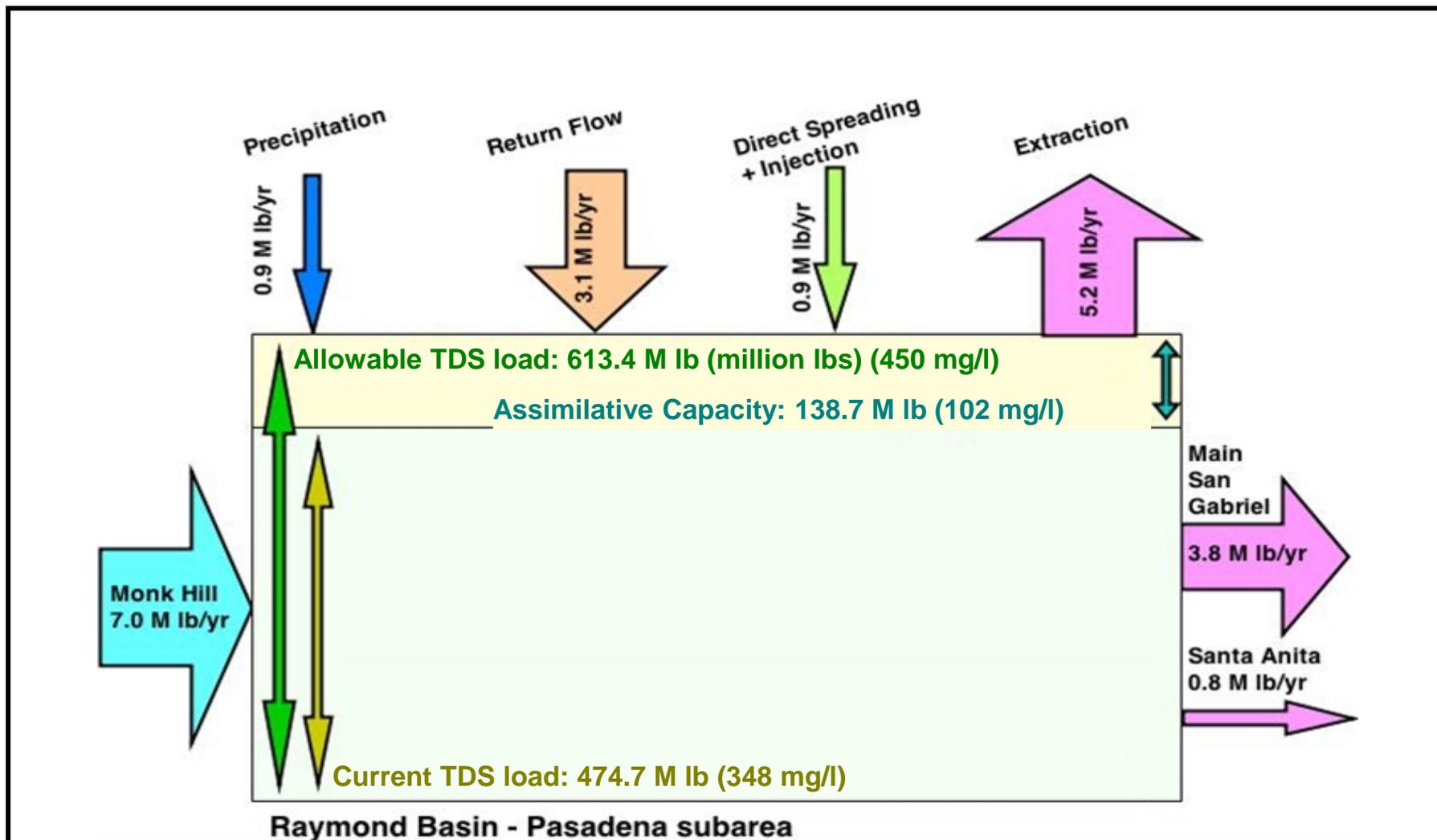
(compiled from Tables III.10 through III.13)



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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA SUBAREA SULFATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



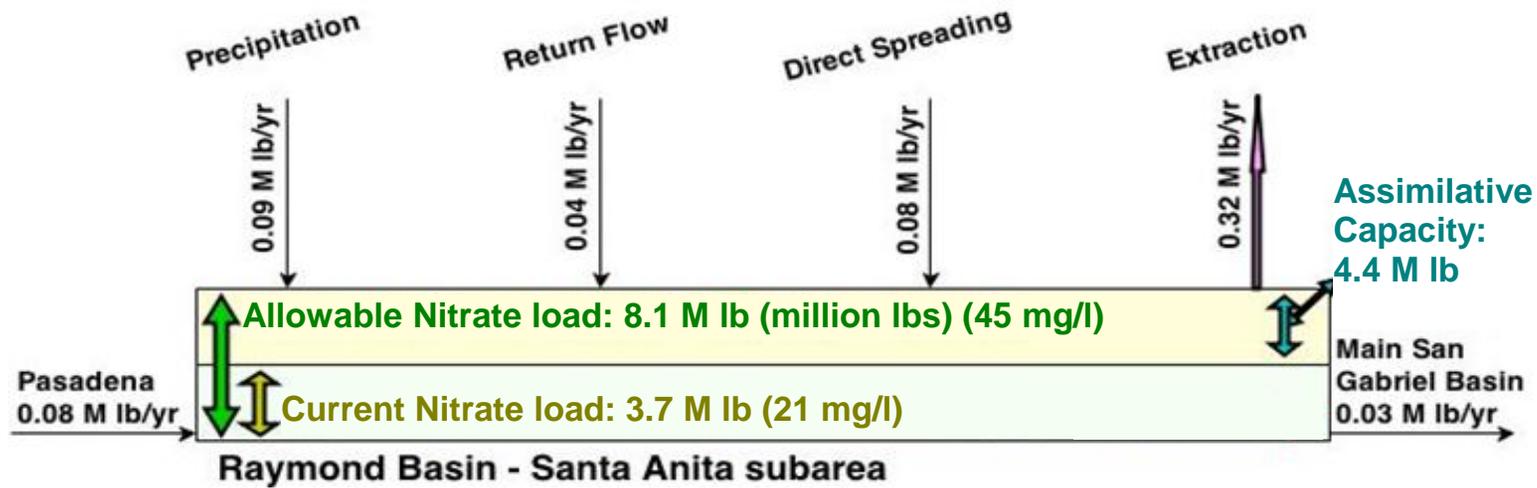
(compiled from Tables III.10 through III.13)



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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA SUBAREA TOTAL DISSOLVED SOLIDS LOADING / UNLOADING  
 BALANCE, 2002-2003 THROUGH 2011-2012



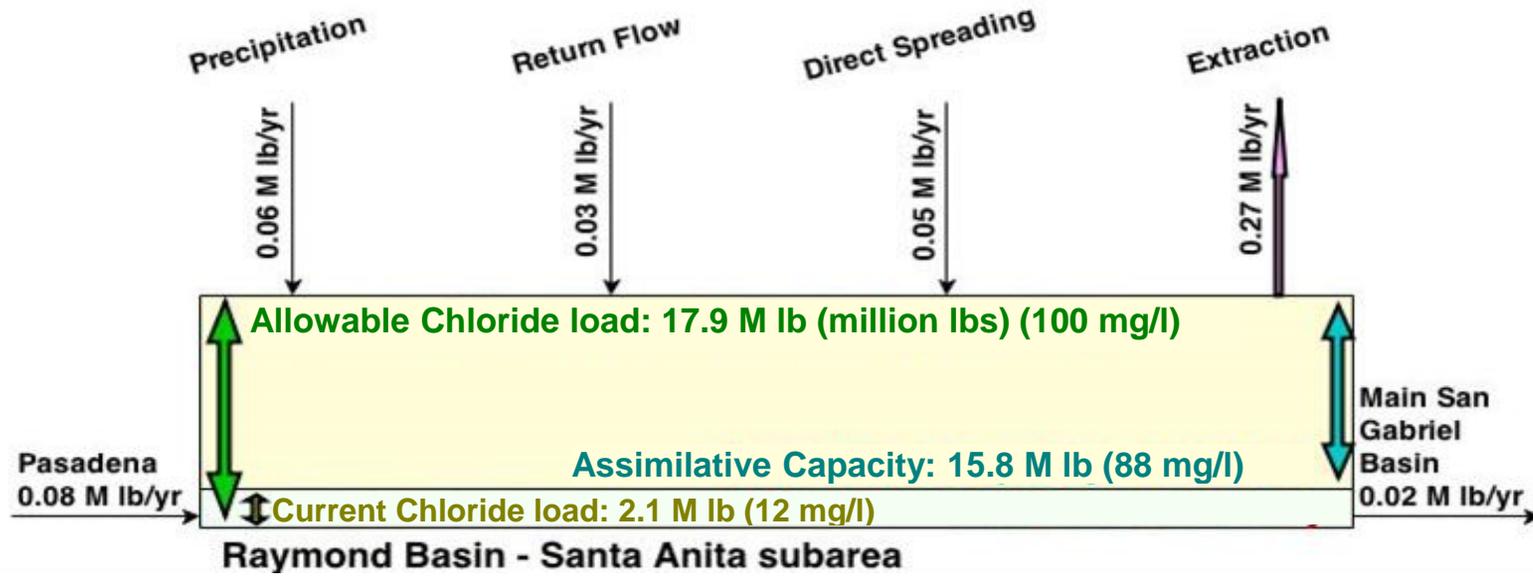
(compiled from Tables III.14 through III.17)



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**RAYMOND BASIN MANAGEMENT BOARD**

SANTA ANITA SUBAREA NITRATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



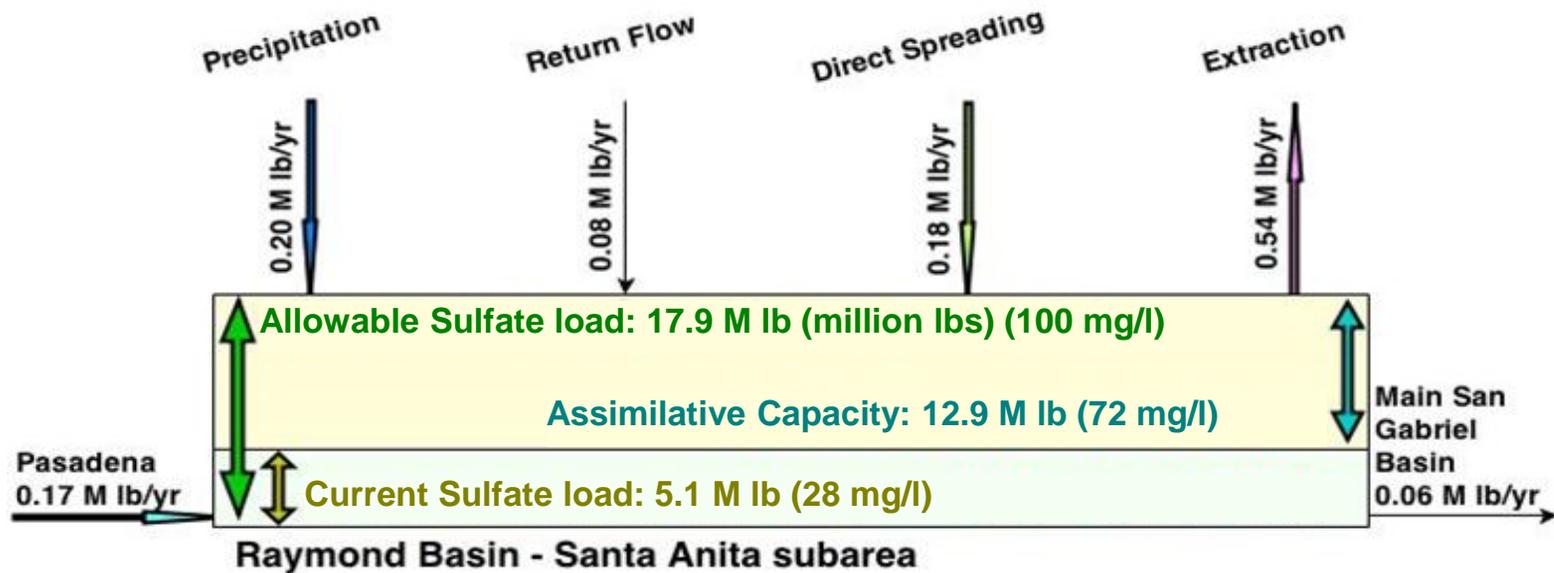
(compiled from Tables III.14 through III.17)



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SANTA ANITA SUBAREA CHLORIDE LOADING / UNLOADING BALANCE,  
 2002-2003 THROUGH 2011-2012



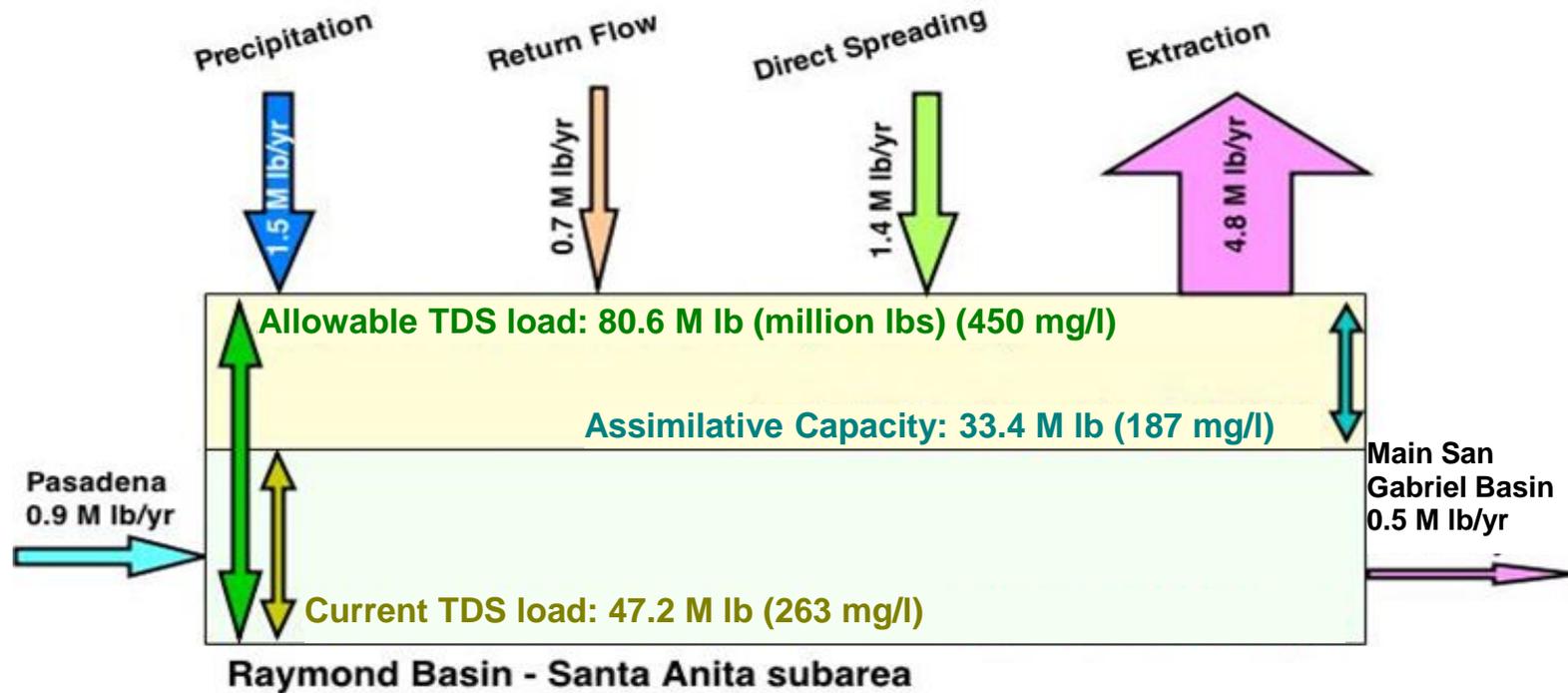
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SANTA ANITA SUBAREA SULFATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012



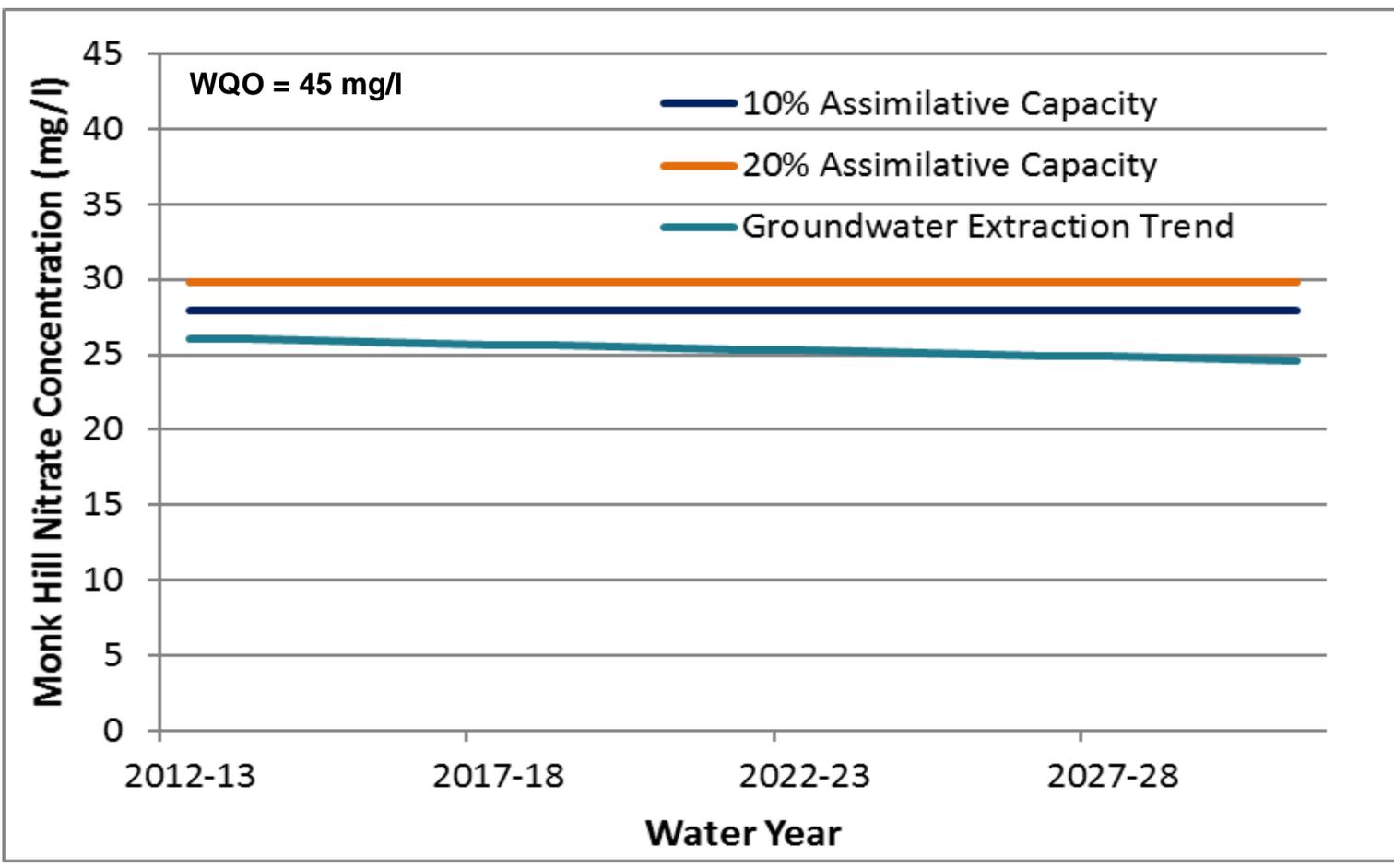
(compiled from Tables III.14 through III.17)



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**RAYMOND BASIN MANAGEMENT BOARD**

SANTA ANITA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) LOADING /  
 UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

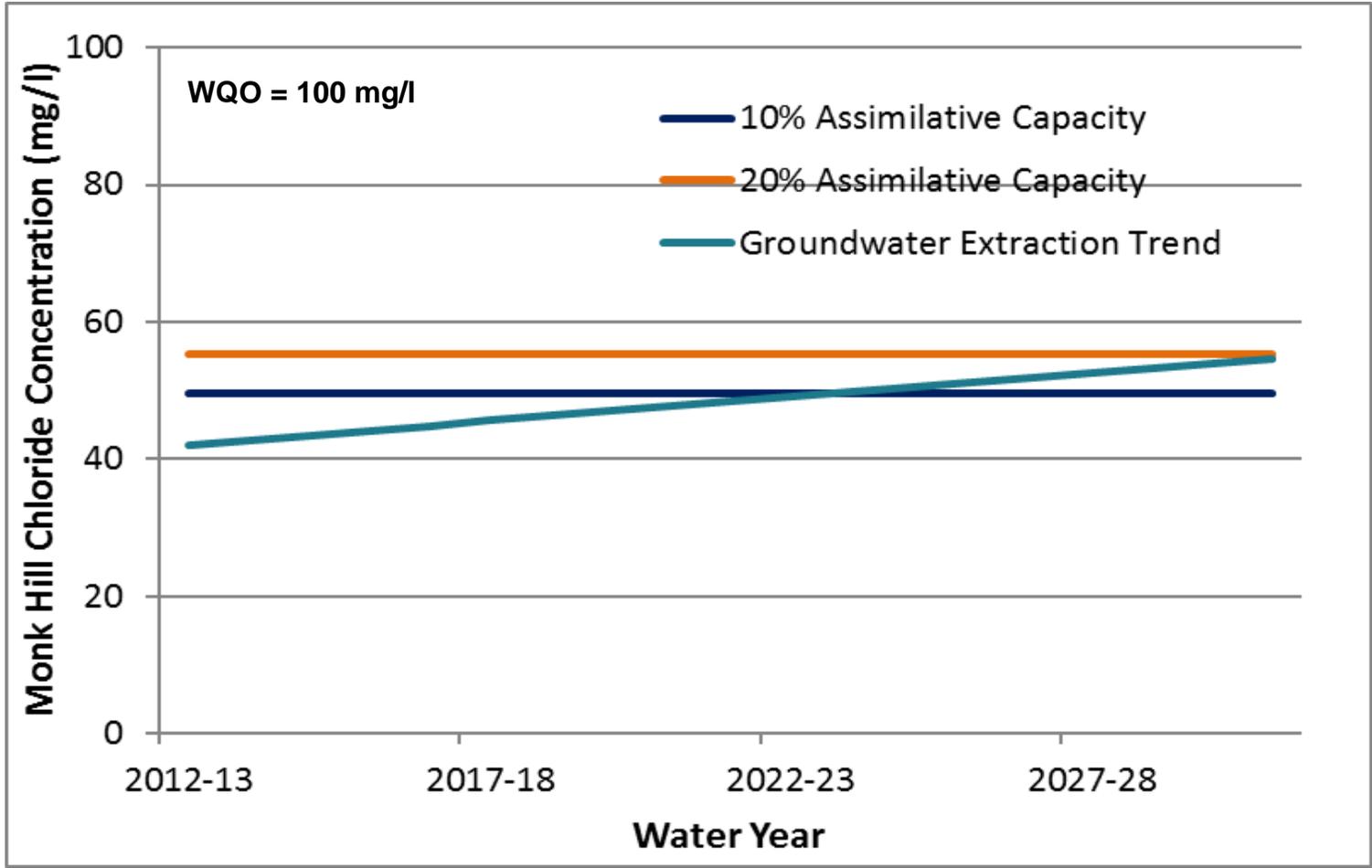


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**RAYMOND BASIN MANAGEMENT BOARD**

**MONK HILL NITRATE CONCENTRATION TREND**

PLATE IV.1a

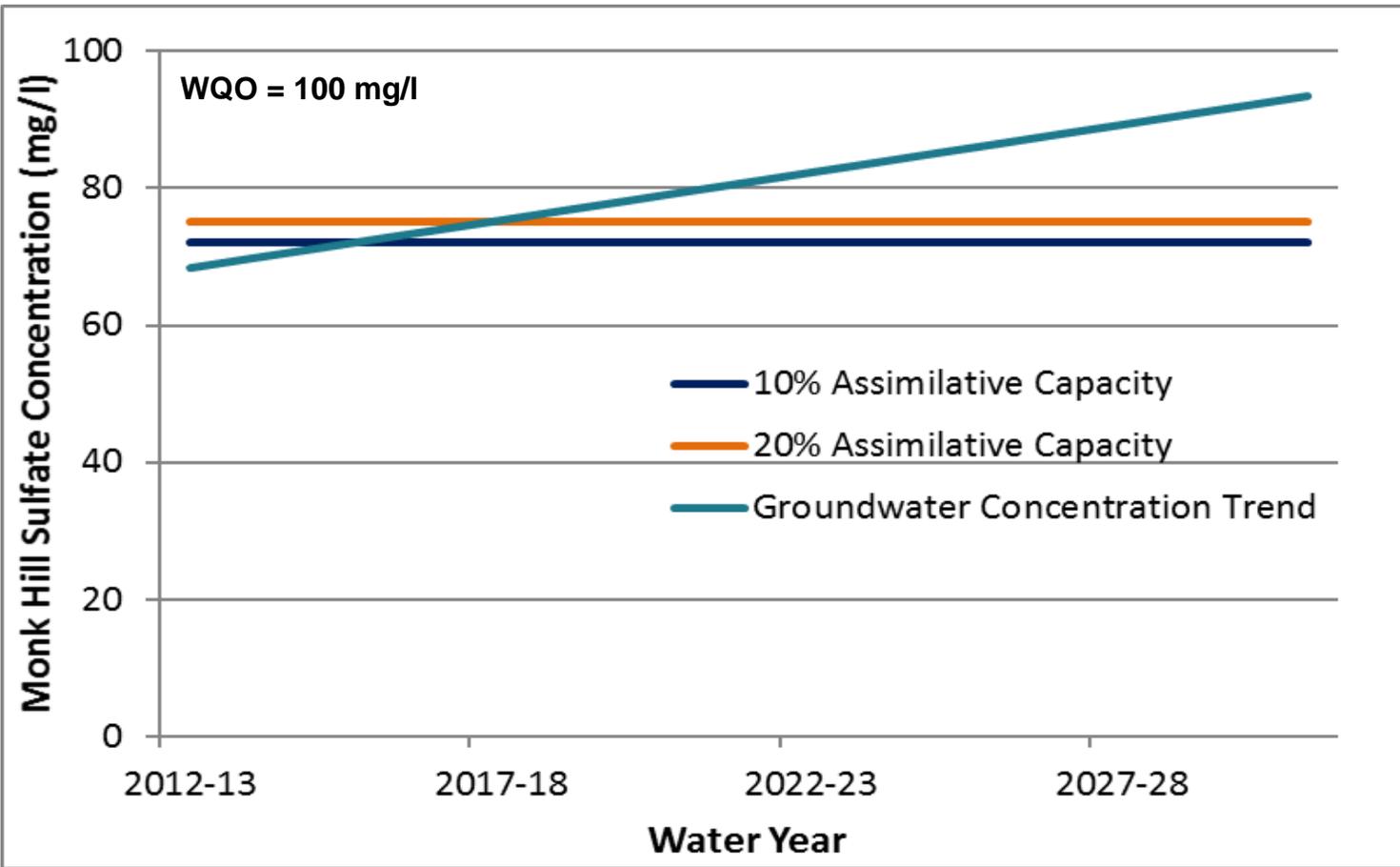


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**RAYMOND BASIN MANAGEMENT BOARD**

MONK HILL CHLORIDE CONCENTRATION TREND

PLATE IV.1b

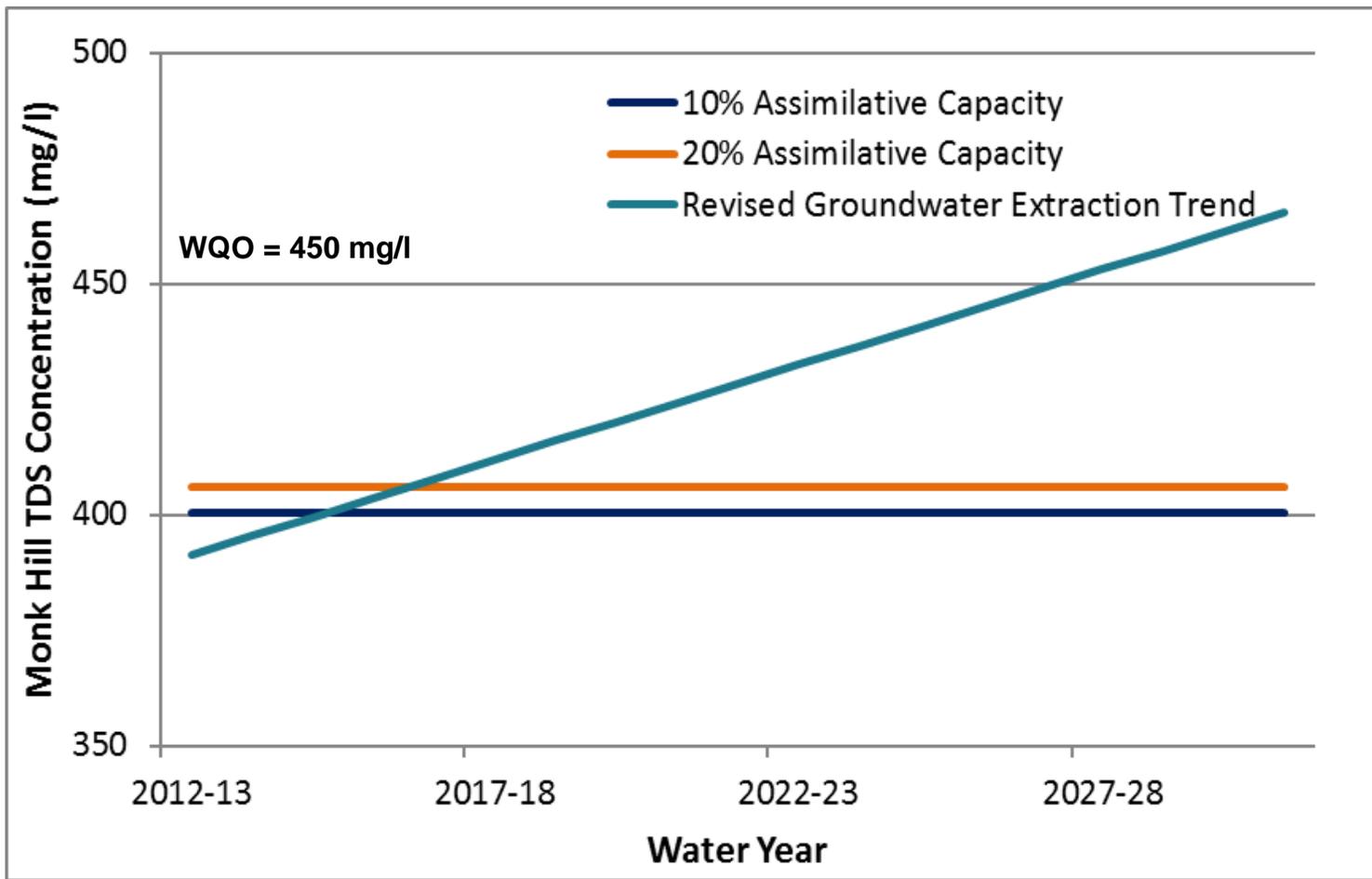


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 WATER RESOURCE ENGINEERS

**RAYMOND BASIN MANAGEMENT BOARD**

MONK HILL SULFATE CONCENTRATION TREND

PLATE IV.1c

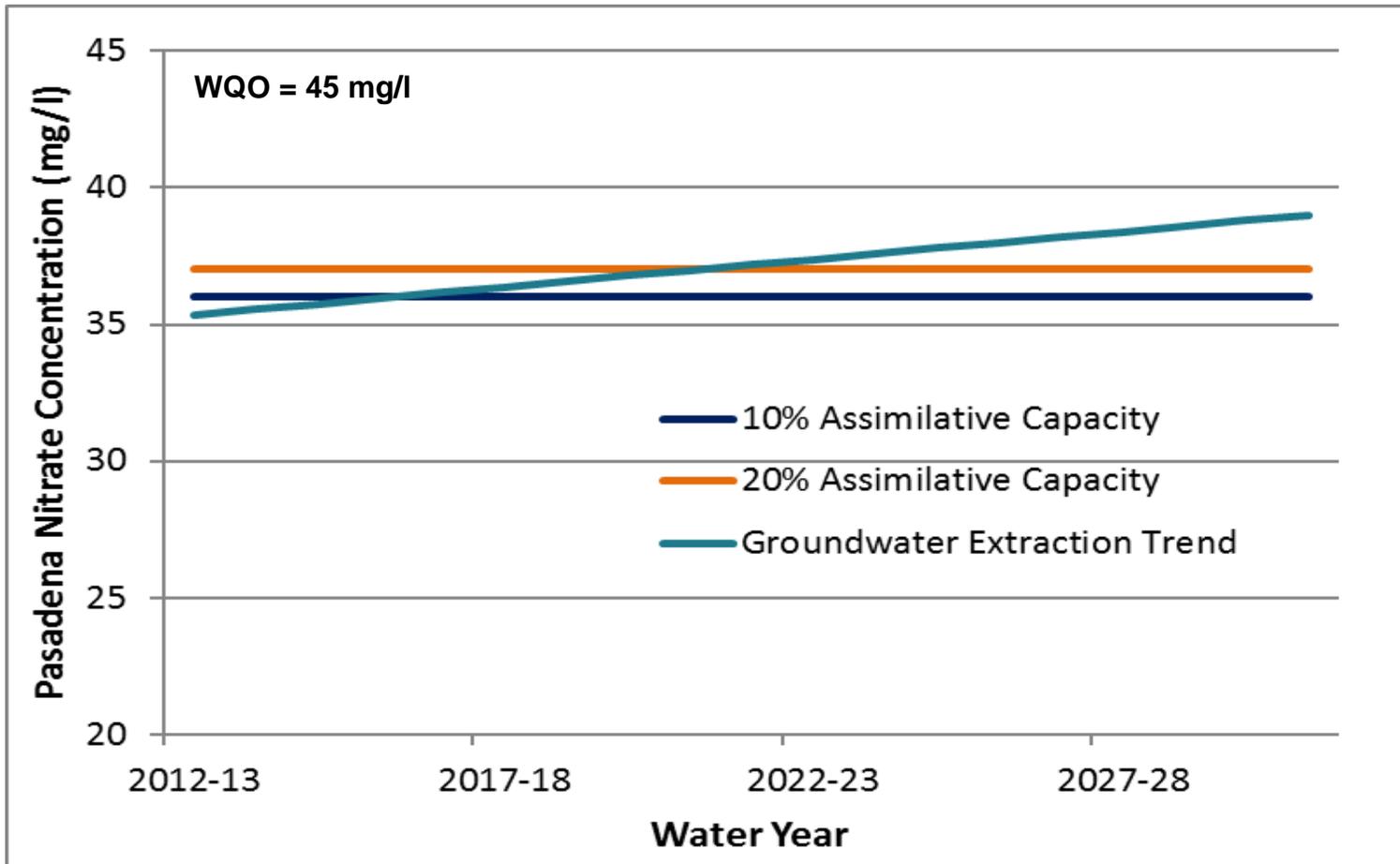


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 WATER RESOURCE ENGINEERS

**RAYMOND BASIN MANAGEMENT BOARD**

MONK HILL TDS CONCENTRATION TREND

PLATE IV.1d

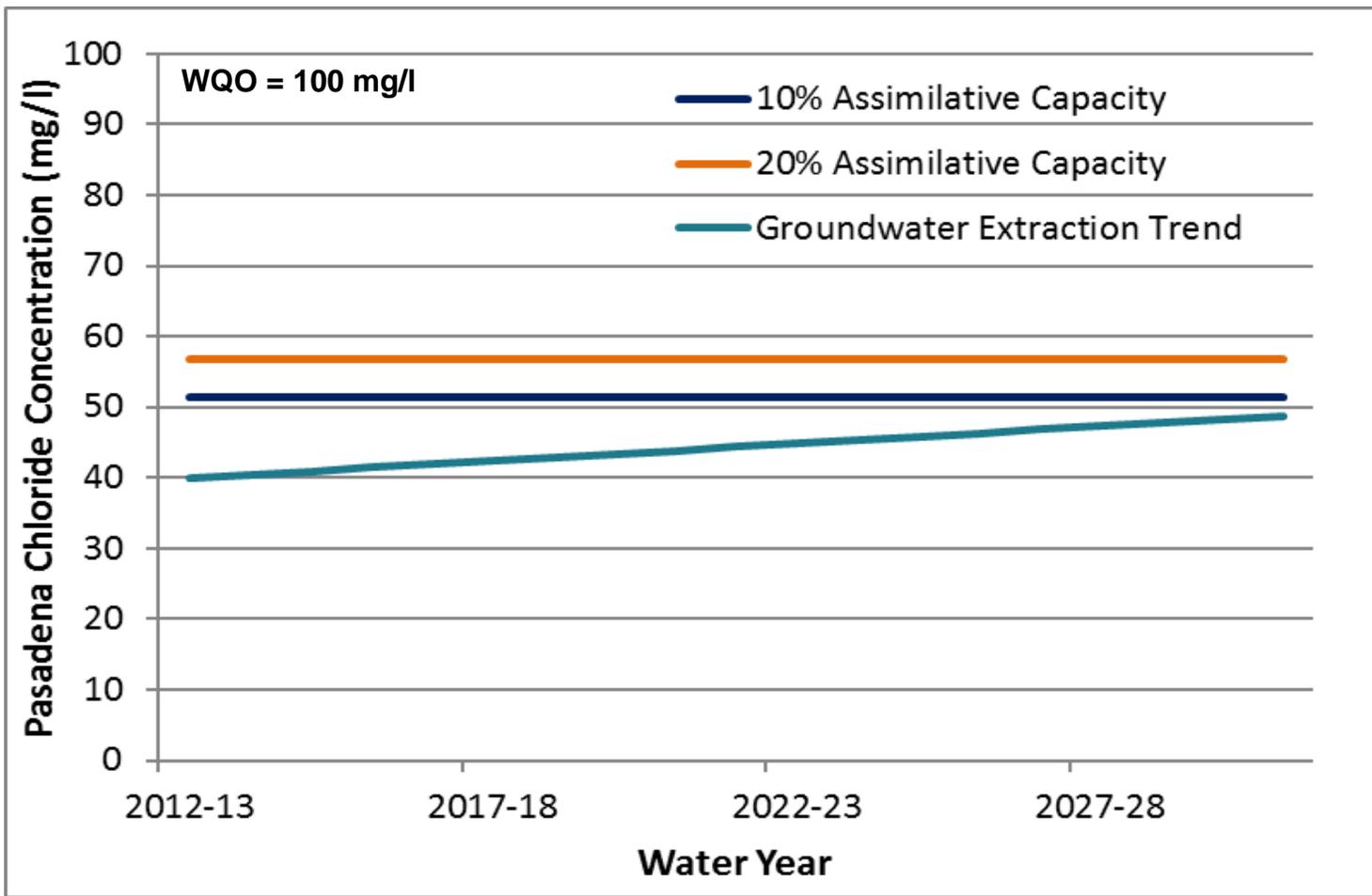


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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA NITRATE CONCENTRATION TREND

PLATE IV.2a

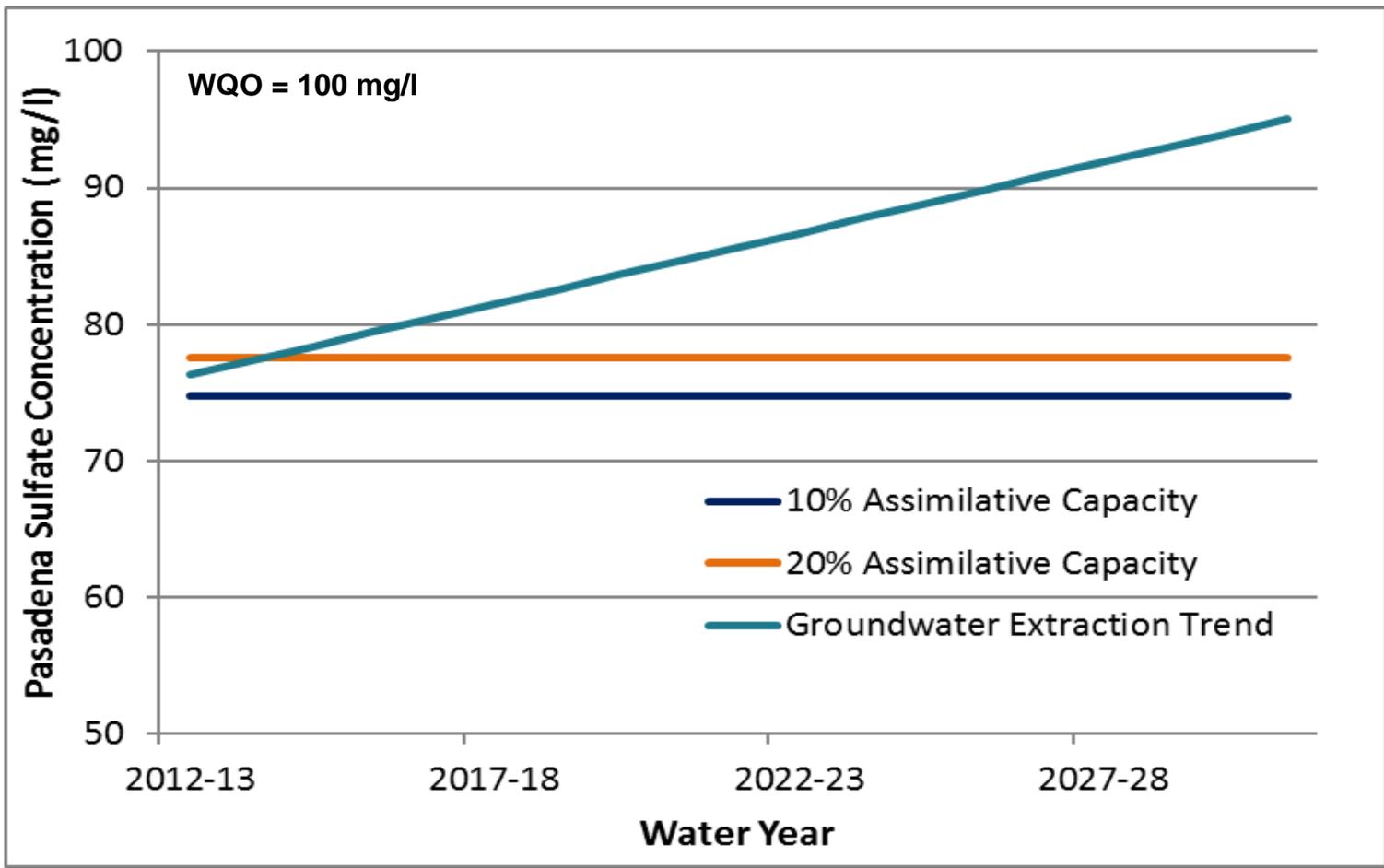


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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA CHLORIDE CONCENTRATION TREND

PLATE IV.2b

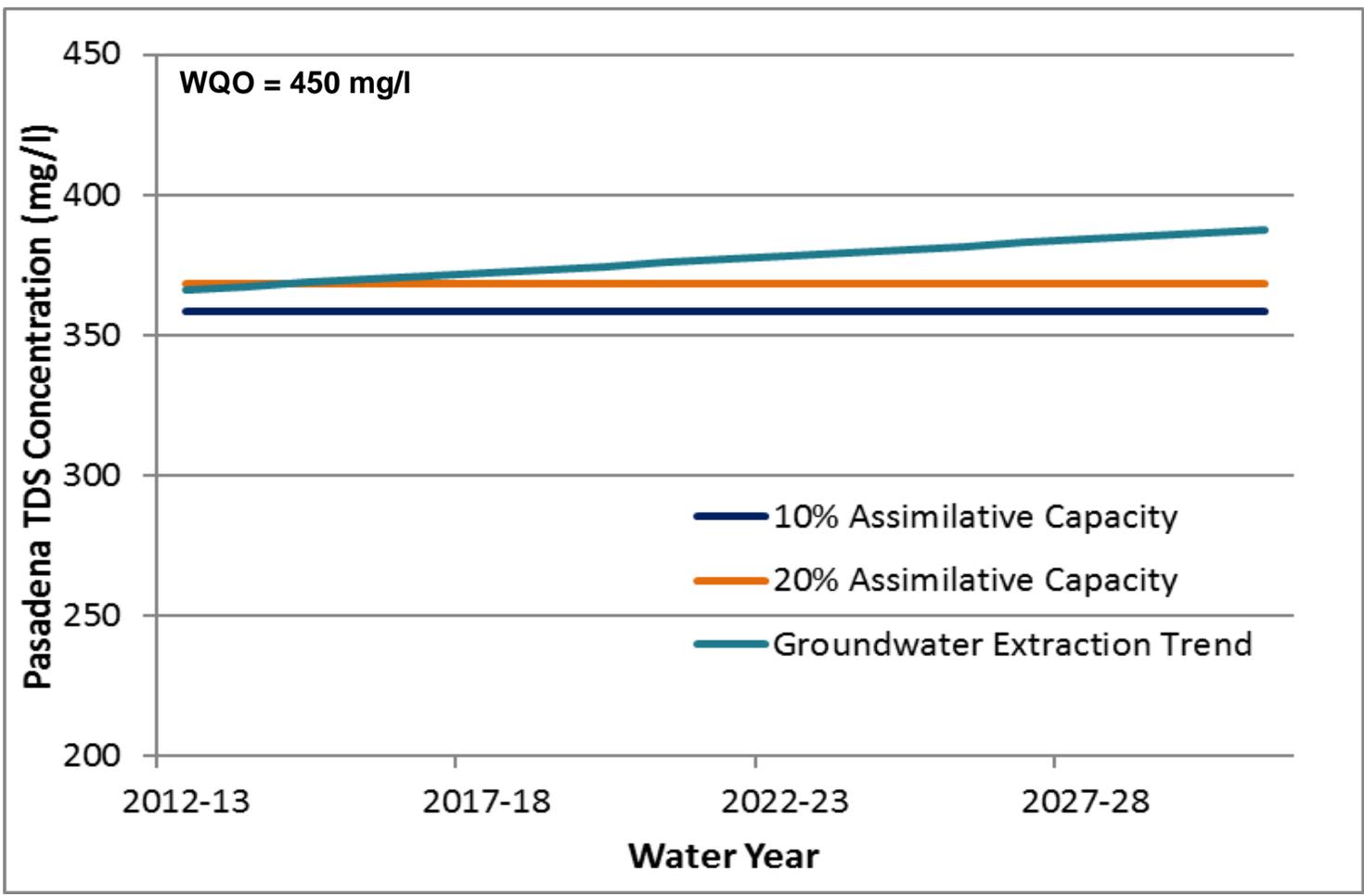


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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA SULFATE CONCENTRATION TREND

PLATE IV.2c

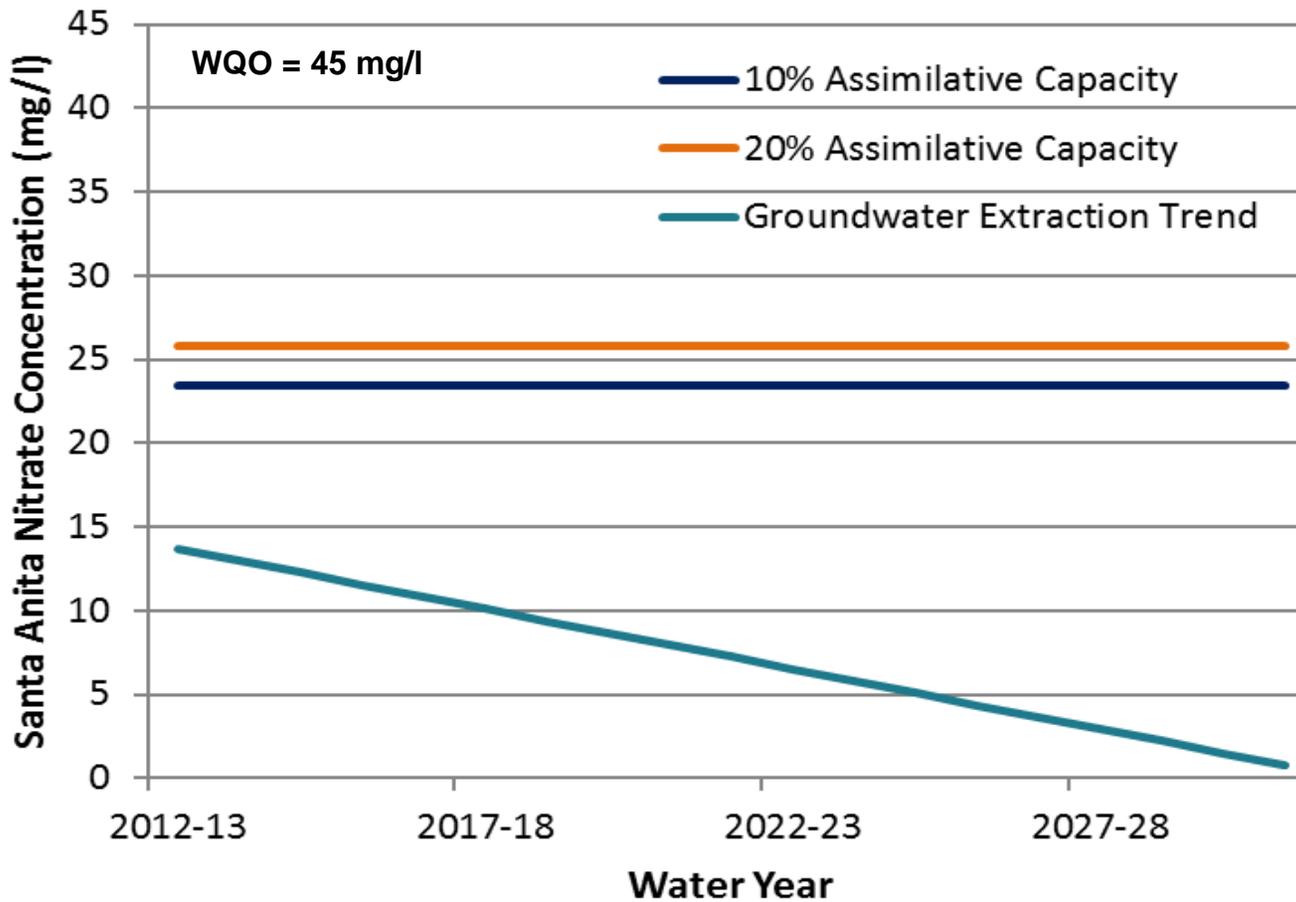


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**RAYMOND BASIN MANAGEMENT BOARD**

PASADENA TDS CONCENTRATION TREND

PLATE IV.2d

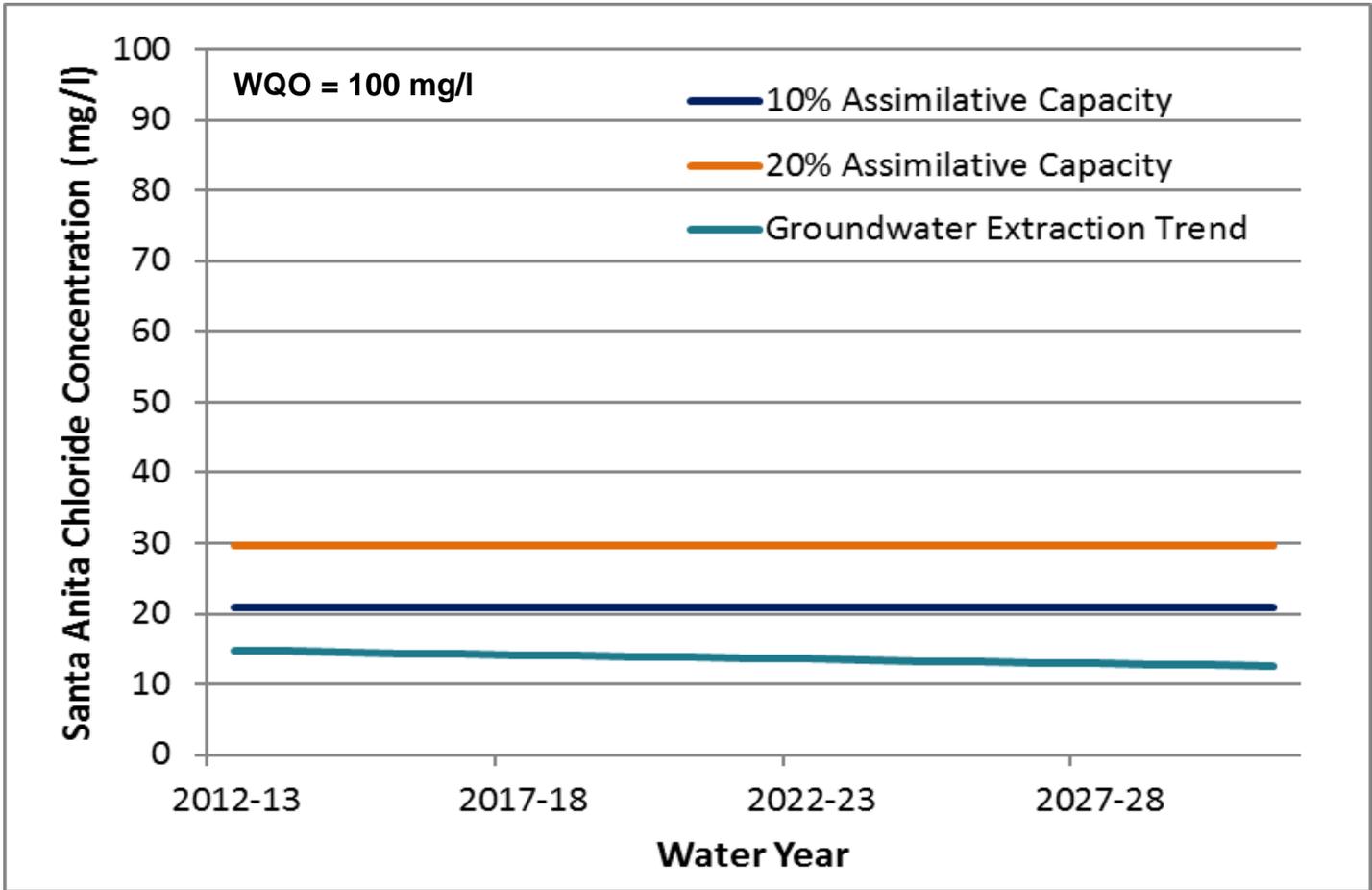


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**RAYMOND BASIN MANAGEMENT BOARD**

SANTA ANITA NITRATE CONCENTRATION TREND

PLATE IV.3a

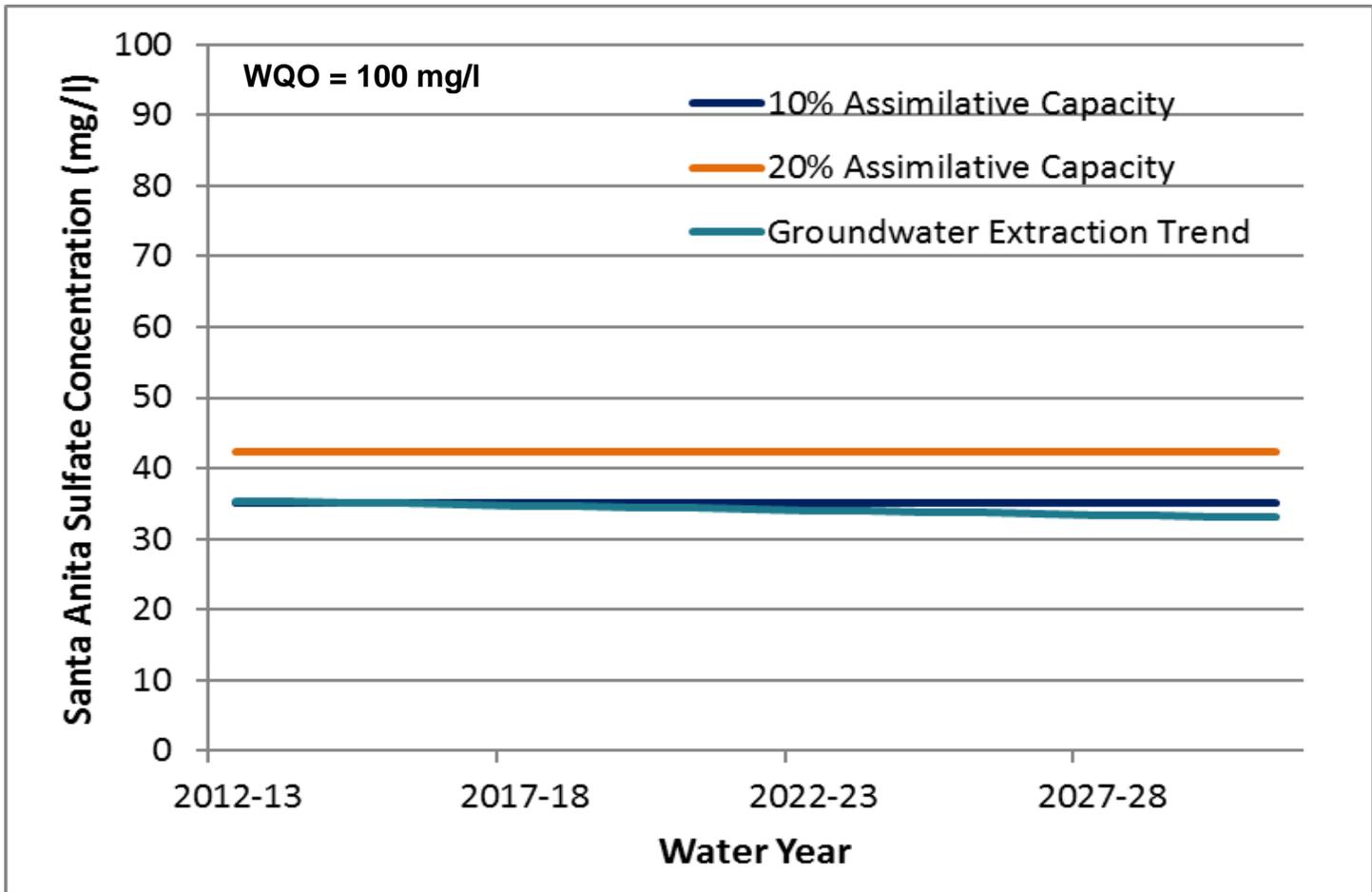


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**RAYMOND BASIN MANAGEMENT BOARD**

SANTA ANITA CHLORIDE CONCENTRATION TREND

PLATE IV.3b

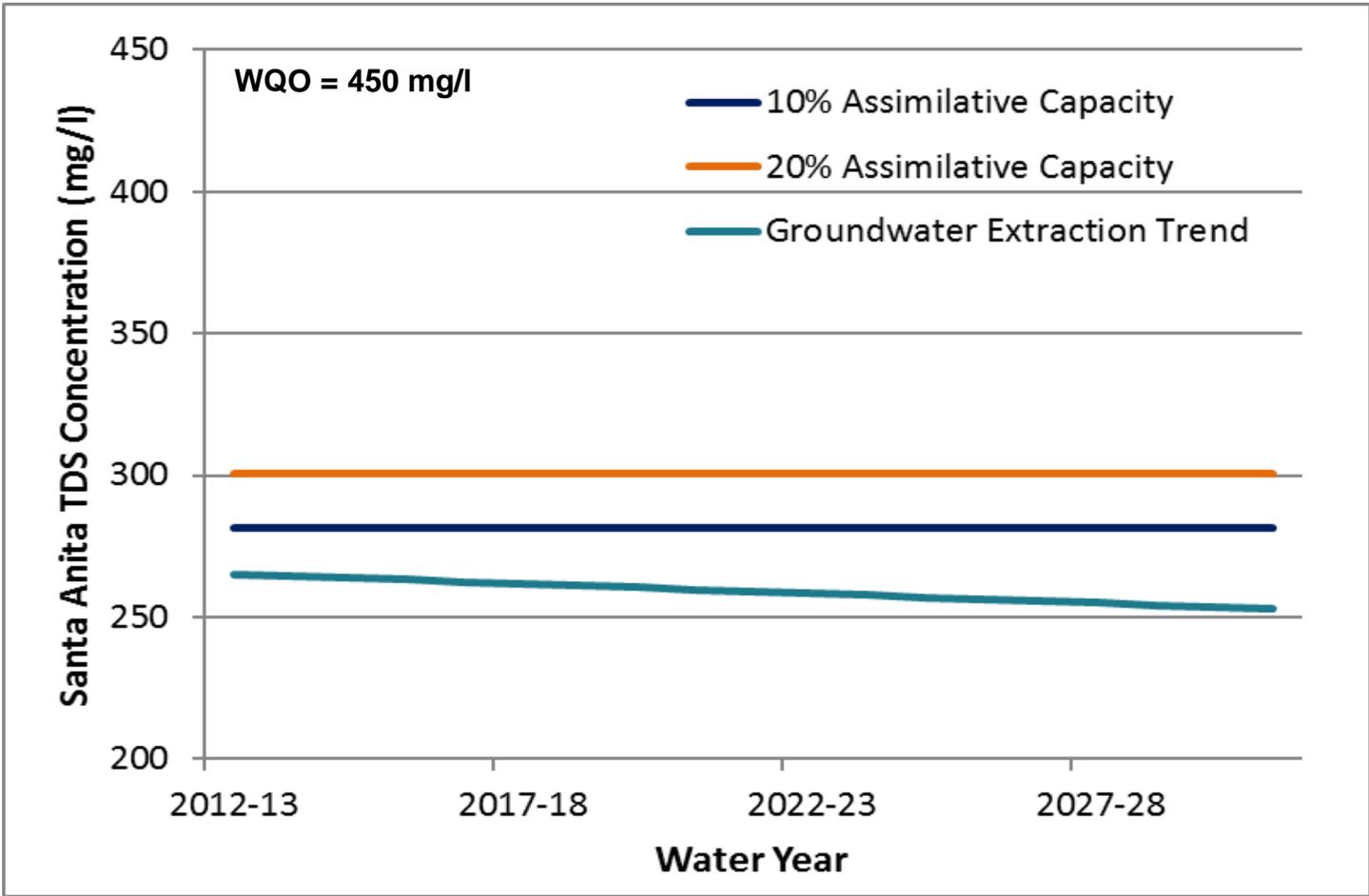


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**RAYMOND BASIN MANAGEMENT BOARD**

SANTA ANITA SULFATE CONCENTRATION TREND

PLATE IV.3c



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**RAYMOND BASIN MANAGEMENT BOARD**

SANTA ANITA TDS CONCENTRATION TREND