Sustainable Groundwater Management Act

2019 Basin Prioritization

Process and Results

State of California
California Natural Resources Agency
Department of Water Resources
Sustainable Groundwater Management Program

APRIL 2019

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Acronyms and Abbreviations

Cal-SIMETAW	California Simulation of Evapotranspiration of Applied Water
CASGEM	California Statewide Groundwater Elevation Monitoring
DOF	California Department of Finance
DWR	California Department of Water Resources
GAMA	Groundwater Ambient Monitoring and Assessment
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
MCL	Maximum Contaminant Level
NHD	National Hydrography Dataset
OSWCR	Online System for Well Completion Reports
PLSS	Public Land Survey System
PWSS	Public Water System Statistics
SGMA	Sustainable Groundwater Management Act
SWRCB	State Water Resources Control Board
USGS	United States Geological Survey
WCR	Well Completion Report (DWR Form 188)

I. Purpose of Report

This report describes the background, process, and results of the Sustainable Groundwater Management Act (SGMA) 2019 Basin Prioritization. The California Department of Water Resources (DWR) is required to update California's groundwater basin prioritization in accordance with the requirements of SGMA and related laws.[1]

II. Introduction

Bulletin 118 – Interim Update 2016 (California Department of Water Resources 2016a) defined 517 groundwater basins and subbasins in California. DWR is required to prioritize these 517 groundwater basins and subbasins as either high, medium, low, or very low. For the purposes of groundwater basin prioritization, basins and subbasins are processed equally and are referred to as basins in this report.

It is the policy of the State through SGMA that groundwater resources be managed sustainably for long-term reliability and multiple benefits for current and future beneficial uses. The State also recognizes that sustainable groundwater management is best achieved locally through the development, implementation, and updating of plans and programs based on the best available science.

DWR plays a key role in providing the framework for sustainable groundwater management in accordance with the statutory requirements of SGMA and other provisions within the California Water Code (Water Code). Other State agencies, including the State Water Resources Control Board (SWRCB) and California Department of Fish and Wildlife, play a role in SGMA implementation and are required to consider SGMA when adopting policies, regulations, or criteria, or when issuing orders or determinations, where pertinent.[2]

III. Background

Groundwater basin prioritization was initially completed by DWR in response to legislation enacted in California's 2009 Comprehensive Water Package (California Department of Water Resources 2009), which established Part 2.11 of the Water Code requiring groundwater elevations be monitored seasonally in all groundwater basins identified in the *Bulletin 118 - 2003 Update*[3] (California Department of Water Resources 2003a). Part 2.11 added general provisions to the Water Code that required DWR to identify the extent of groundwater elevation monitoring undertaken within each basin and directed DWR to prioritize basins for that purpose. In response to the new requirements of Part 2.11, DWR established the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. In June 2014, the CASGEM Program released its prioritization for the groundwater basins identified in *Bulletin 118 - 2003*

[1] Water Code sections 10722.4 and 10933.

[2] Water Code Section 10720.9.

[3] Stats. 2009-2010, 7th Ex. Sess., c. 1 (S.B.6), § 1, eff. Feb. 3, 2010.

Update. The CASGEM 2014 Basin Prioritization classified basins as high, medium, low, or very low based on the consideration of the eight components required in Water Code Section 10933(b).

In September 2014, Governor Brown signed into law three bills that formed SGMA.[4] SGMA required DWR to update basin priority for each groundwater basin no later than January 31, 2015, and reassess the prioritization anytime DWR updates Bulletin 118 basin boundaries.[5] DWR applied the CASGEM 2014 Basin Prioritization as the initial SGMA 2015 Basin Prioritization under SGMA, resulting in the designation of 127 high and medium priority basins (California Department of Water Resources 2014a).

In the fall of 2016, DWR completed and released groundwater basin boundary modifications. *Bulletin 118 – Interim Update 2016*, which included the final boundary modifications, was published on December 22, 2016. As a result of these modifications, updated basin prioritizations were required for the 517 groundwater basins identified in Bulletin 118. In May of 2018, DWR released the draft basin prioritization results for the 517 basins and held a 94-day public comment period. Simultaneously, local agencies requested a subsequent round of basin boundary modifications. This required DWR to prioritize the basins in two phases (referred to as SGMA 2019 Basin Prioritization Phase 1 and 2).

The SGMA 2019 Basin Prioritization Phase 1 focused on the basins that used the *Bulletin 118 – Interim Update 2016* basin boundary shapefile (California Department of Water Resources 2016b) and not affected by the 2018 basin boundary modifications. This phase allowed DWR to finalize in January 2019 the SGMA 2019 Basin Prioritization Phase 1 priorities that included 458 basins.

SGMA 2019 Basin Prioritization Phase 2 covers the remaining 57 basins that include the 53 basins that were modified and approved, as well as two that were not approved by DWR as part of the 2018 basin boundary modifications, plus two basins whose boundary modifications were from Assembly Bill 1944. All 57 basins of SGMA 2019 Basin Prioritization Phase 2 used the *Bulletin 118 – Update 2019* basin boundary shapefile (California Department of Water Resources 2019).

SGMA applies to all California groundwater basins and requires that high- and medium-priority groundwater basins form Groundwater Sustainability Agencies (GSAs) and be managed in accordance with locally-developed Groundwater Sustainability Plans (GSPs) or Alternatives to GSPs (Alternatives). High- and medium-priority basins that are identified in *Bulletin 118 – Interim Update 2016* as a critically overdrafted basin are required to submit a GSP by January 31, 2020. The remaining high- and medium-priority basins identified in January 2015 are required to submit a GSP by January 31, 2022. Basins newly identified as high- or medium-priority in the SGMA 2019 Basin Prioritization are required to form a GSA or submit an Alternative within two years from the date the basin's priority is finalized and are required to submit a GSP five years from the same finalization date.

[4] Stats.2014, c. 346 (S.B.1168), § 3, c. 347 (A.B.1739), § 18, c. 348 (S.B.1319), § 2, eff. Jan. 1, 2015.

[5] Water Code sections 10722.4(b) and 10722.4(c)

IV. SGMA 2019 Basin Prioritization

The SGMA 2019 Basin Prioritization process was conducted to reassess the priority of the groundwater basins following the 2016 basin boundary modification, as required by the Water Code.[6] For the SGMA 2019 Basin Prioritization, DWR followed the process and methodology developed for the CASGEM 2014 Basin Prioritization, adjusted as required by SGMA and related legislation. DWR is required to prioritize basins for the purposes of SGMA,[7] which was enacted, among other things, to provide for the sustainable management of groundwater basins. This entailed a reassessment of factors that had been utilized in the CASGEM program to prioritize basins based on groundwater elevation monitoring. SGMA also required DWR to continue to prioritize basins based on a consideration of the components specified in Water Code Section 10933(b), but the list of components had been amended to include the italicized language:

1. The population overlying the basin or subbasin.
2. The rate of current and projected growth of the population overlying the basin or subbasin.
3. The number of public supply wells that draw from the basin or subbasin.
4. The total number of wells that draw from the basin or subbasin.
5. The irrigated acreage overlying the basin or subbasin.
6. The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water.
7. Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation.
8. Any other information determined to be relevant by the department, *including adverse impacts on local habitat and local streamflows* [emphasis added].

DWR incorporated new data, to the extent data are available [8], and the amended language of Water Code Section 10933(b)(8) (component 8) to include an analysis of adverse impacts on local habitat and local streamflows as part of the SGMA 2019 Basin Prioritization. Evaluation of groundwater basins at a statewide scale does not necessarily capture the local importance of groundwater resources within the smaller-size or lower-use groundwater basins. For many of California's low-use basins, groundwater provides close to 100 percent of the local beneficial uses. Thus, when reviewing the SGMA 2019 Basin Prioritization results, it is important to recognize the findings are not intended to characterize groundwater management practices or diminish the local importance of the smaller-size or lower-use groundwater basins; rather, the results are presented as a statewide assessment of the overall importance of groundwater resources in meeting beneficial uses.

[6] Water Code Section 10722.4(c)

[7] Water Code Section 10722.4(a)

[8] Water Code Section 10933(b)

The following information was deemed relevant and considered as part of component 8 for the SGMA 2019 Basin Prioritization based on SGMA:

- Adverse impacts on local habitat and local streamflows.
- Adjudicated areas.
- Critically overdrafted basins.
- Groundwater-related transfers.

Additional information about how each of these components were analyzed can be found in the process section of this document.

V. Process

The CASGEM 2014 and SGMA 2019 basin prioritization used the basin's total priority points assigned to each of the eight components to determine the priority. Based on the total accumulated priority points, the basin was assigned a very low, low, medium, or high priority. Both prioritization processes included additional evaluations of the basins that could alter the points assigned and thus the priority.

The data sources, processes, and steps used to evaluate each of the eight components of Water Code Section 10933(b) for the SGMA 2019 Basin Prioritization are described below. Supplemental data submitted during the May 2018 Draft Basin Prioritization comment period was also considered before finalization.

Component 1: The population overlying the basin or subbasin[9]

Data Source

- 2010 United States Census population block data (California)

Process

Population density was analyzed for the SGMA 2019 Basin Prioritization using the same methods and data relative to the CASGEM 2014 Basin Prioritization. The 2010 United States Census population block data (United States Census Bureau 2010a and 2010b) was used to calculate the population overlying each groundwater basin using the following methods:

- For population blocks contained wholly within a basin boundary, all population in the block was included in the basin population total.
- For population blocks located partially within the basin, the proportion of the population included was equal to the proportion of the area of the block contained within the basin and was applied to the basin population total. For example, if 60% of the population block was within basin boundaries, then 60% of the reporting block total population was attributed to the total population of the basin.

[9] Water Code Section 10933(b)(1)

Step 1 – Calculate Basin's Total Population: The basin's total population was calculated by summing all the included population blocks per the two methods described above.

Step 2 – Calculate the Population Density: The basin's 2010 population density was calculated by dividing the basin's total population (Step 1) by the basin's area (square miles – Appendix 1).

Table 1 lists the priority points and associated ranges of population density.

Table 1 Component 1: Priority Points and Ranges for Population Density

Priority Points	Population Density (people/square mile) 'x' = population density
0	x < 7
1	7 ≤ x < 250
2	250 ≤ x < 1,000
3	1,000 ≤ x < 2,500
4	2,500 ≤ x < 4,000
5	x ≥ 4,000

Component 2: The rate of current and projected growth of the population overlying the basin or subbasin[10]

Data Source

- 2000 and 2010 United States Census population block data (California)
- California Department of Finance (DOF) current trend 2030 county population projections
- 2000 and 2010 county population estimates developed for the California Water Plan Update 2018 (California Department of Water Resources 2018a)

Process

Population growth was analyzed for the SGMA 2019 Basin Prioritization using the same methods and data relative to the CASGEM 2014 Basin Prioritization.

Part A: Estimating Basin and Non-Basin Population within each County

Step 1 – Calculate the 2000 and 2010 Basin Population: The 2000 (United States Census Bureau 2000a and 2000b) and 2010 population were estimated for all basins and portions of basins within each county using the methods described for component 1.

Step 2 – Calculate the 2000 and 2010 Non-Basin Area Population by County: For each county, the 2000 United States Census population block data (United States Census Bureau 2000a and b) and 2010

[10] Water Code Section 10933(b)(2)

United States Census population block data were used to calculate the population overlying the non-basin area in each county:

- For population blocks contained wholly outside of a basin boundary and within the county, all population in the block was included in the non-basin population total for the county.
- For population blocks located partially outside of a basin boundary and within the county, the proportion of the population block contained outside of a basin was applied to the non-basin population total for the county. For example, if 40 percent of the reporting block total population was located outside of a basin boundary, 40 percent of the population was attributed to the total population of the non-basin area.
- For population blocks located outside of a basin boundary and partially outside of the county, the proportion of the population block contained within the county was applied to the non-basin population total. For example, if 60 percent of the population block was within county boundaries, then 60 percent of the reporting block total population was attributed to the total population of the non-basin area.

Step 3 – Calculate the Difference Between the 2000 and 2010 Population: The difference between the 2000 and 2010 population estimates for each of the basins, portions of basins, and non-basin areas was calculated within each county.

Step 4 – Calculate the Share of the Basin's Population Growth: The total population difference for the county was determined by summing the values from Step 3. The share (percentage) of the basin's population growth over the 2000 to 2010 decade was calculated by dividing the total basin population difference by the total county population difference.

Step 5 – Calculate the Projected Population Change from 2010 to 2030: The DOF current trend 2030 population projection for the county was used to determine the total change in county population between 2010 estimates and 2030 population projections.

Step 6 – Calculate the 2030 Population Projection: Each basin and non-basin share percentage (Step 4) was multiplied by the total 2030 projected change (Step 5) to produce a 2030 population projection for each basin and non-basin area within the 58 counties. For most basins located within a single county, the 2030 population projection was considered complete. Some low-population basins required minor adjustments when the projected population resulted in a negative value. In these situations, the population was adjusted to zero and the initial basin's results were redistributed to the other basin and non-basin areas in the county. For basins located in more than one county, the 2030 population projections for each portion of a basin that crossed a county boundary were summed to produce a 2030 population projection for the entire basin.

Estimates of population growth obtained using the methods described above were evaluated and adjusted, as necessary, to conform with DOF current trend 2030 county projections per California Government Code Section 13073(c).

Part B: Determining the 2030 Population Growth (Percentage)

The projected percent growth within each basin was determined by subtracting the 2010 population estimate (component 1) from the 2030 population projection (Step 6 of Part A) and dividing the result by the 2010 populations estimate:

Percent Growth =
*((Projected 2030 Basin Population – 2010 Basin Population) / 2010 Basin Population) * 100*

Part C: Determining the Priority Points for Population Growth

Using the percent growth calculated in Step 4 of Part A, the basin was assigned the preliminary priority points identified in Table 2. Before determining the priority points, additional analysis was completed to determine if the basin met the minimum requirements for population growth as defined in the CASGEM 2014 Basin Prioritization process (California Department of Water Resources 2014b):

- Does the basin have zero 2010 population?
- Does the basin have less than or equal to zero percent growth?
- Is the basin's 2010 population (component 1) less than 1,000 people and does the basin have growth greater than zero?
- Is the basin's 2010 basin population less than or equal to 25,000 and is the basin's 2010 population density less than 50 people per square mile?

If the answer was 'yes' to any of the four questions above, the priority points for component 2 were recorded as zero. If the answer was 'no' to all four questions above, the priority points were applied to each basin based on the percentage of population growth. Table 2 lists the priority points and associated ranges of population growth percentage.

Table 2 Component 2: Priority Points and Ranges for Population Growth

Priority Points	Population Growth (percent) 'x' = Population growth percentage
0	$x \leq 0$
1	$0 < x < 6$
2	$6 \leq x < 15$
3	$15 \leq x < 25$
4	$25 \leq x < 40$
5	$x \geq 40$

Component 3: The number of public supply wells that draw from the basin or subbasin[11]

Data Source

- SWRCB, Division of Drinking Water - Public Supply Database, March 2016
- Verified local public supply well location and use information received through public comment process

Process

Public supply wells were analyzed for the SGMA 2019 Basin Prioritization using the same methods and updated data relative to the CASGEM 2014 Basin Prioritization.

The SWRCB public supply well database (State Water Resources Control Board 2016) was used to calculate the number of public supply wells that draw from the basin, as it is the only statewide dataset that includes records associated with supply water for the public. The SWRCB public supply well database was accessed during March 2016 for the SGMA 2019 Basin Prioritization process. Each record in the database contains fields for active and inactive systems, water source (groundwater or surface water), and testing location. Different records for the same public supply system can exist due to separate testing locations for water quality. In most cases, the only distinction is in the location name.

The public supply data was processed by taking the following steps:

Step 1 – Query the Public Supply Well Database for Active Wells: The individual public supply wells that draw from each basin were determined by querying the public supply well database for entries classified as 'active,' and 'groundwater,' and that contained the word 'well' in the location name. Only wells active as of the time the data was extracted (March 2016) were included in this analysis. The number of individual public supply wells determined in this manner is not intended to establish an absolute value for any given basin, but to provide a relative measure of such wells between basins.

Step 2 – Perform Quality Control of Public Supply Well Coordinates: Each record from Step 1 was reviewed to identify incomplete or blank coordinates. Incomplete coordinates did not include enough decimal places in the coordinates to reliably map. They were corrected, when possible, using available attributes provided with public supply data. Records with blank coordinates were also corrected, when possible, using available attributes provided with public supply data. Wells with corrected coordinates were identified as modified with a "DWR" tag.

Step 3 – Compare Coordinates to County Codes: Public supply well locations were compared to the two-digit County Code included in the Public Water System Identification Number. If the well location did not fall within the proper county and location information was not readily available in the public supply well attributes, the public supply well was not included in the dataset.

[11] Water Code Section 10933(b)(3)

Step 4 – Sum of Wells in Basin: Using Geographic Information System (GIS) software, the number of wells in each basin were counted based on the reconciled information from Steps 2 and 3.

Step 5 – Calculate the Public Supply Well Density: To calculate the public supply well density, the number of public supply wells (Step 4) was divided by the basin area (square miles).

Priority points were applied to each basin based on the calculated public supply well density. Table 3 lists the priority points and associated ranges of public supply well density.

Table 3 Component 3: Priority Points and Ranges for Public Supply Well Density

Priority Points	Public Supply Well Density (x = wells per square mile)
0	$x = 0$
1	$0 < x < 0.1$
2	$0.1 \leq x < 0.25$
3	$0.25 \leq x < 0.5$
4	$0.5 \leq x < 1.0$
5	$x \geq 1.0$

Component 4: The total number of wells that draw from the basin or subbasin[12]

Data Source

- Online System for Well Completion Reports (OSWCR) (California Department of Water Resources 2017)
- Verified local well location and use information received through public comment process

Process

Production wells were analyzed for the SGMA 2019 Basin Prioritization using updated methods and data relative to the CASGEM 2014 Basin Prioritization. Updated methods included defining production wells and improving the well location process. Both updated methods are further described below.

DWR's new OSWCR database, which was not available at the time of the CASGEM 2014 Basin Prioritization, was used for the SGMA 2019 Basin Prioritization. The OSWCR database is a statewide dataset of well completion reports (WCRs). Each WCR contains useful information including well type, location, construction details, time of drilling, well performance, and aquifer characteristics.

[12] Water Code Section 10933(b)(4)

Part A – Identifying Production Wells

The OSWCR database was used to identify production wells whose well use type within the WCR is listed as agriculture, domestic, irrigation, municipal, commercial, stock, industrial, or other extraction. If the well use type was not provided on the WCR, the following information, if present, was evaluated to determine if the WCR would be used for component 4.

- Many WCRs with an 'unknown' well type provide information about the well casing size and total depth. Criteria for separating production from non-production wells based on well casing size and total depth was established by reviewing domestic and water quality monitoring WCRs. It was determined that screening for a well casing greater than or equal to 4 inches and a total depth greater than or equal to 22 feet to identify production wells would provide the best balance between the urban and rural well characteristics. If the criteria of a well casing greater than or equal to 4 inches and a total depth greater than or equal to 22 feet were met, the WCR was considered to represent a production well.
- In some cases, the WCR only provided information on either well casing diameter or well depth information. For WCRs that only provided well casing size, the casing had to be greater than or equal to 4 inches to be considered a production well. For WCRs that only provided well depth, the well depth had to be greater than or equal to 22 feet to be considered a production well.

Part B – Determining the Location of Production Wells to the Highest Resolution

Well locations were determined using information included on the WCRs. For WCRs that included latitude and longitude, the coordinates were used to determine well locations. The spatial resolution in these cases was assumed to be absolute.

For WCRs that provided a spatial reference location based on Public Land Survey System (PLSS) data, a centroid location was assigned. The spatial reference location for a well gives a general well location within a known area rather than the actual well location. The process for assigning a well location to a spatial reference location based on information provided in the WCRs is discussed below:

- **WCRs with township-range-section, baseline meridian, and county information:** For WCRs that included township-range-section, baseline meridian, and county information, a section centroid was used as the well location. If the given section was split by a county line, a county-section was created for each portion of the section, and WCRs that identified the county and PLSS location were assigned to that county-section. WCRs were assigned coordinates representing their respective county-section centroid. The spatial resolution in these cases was less than or equal to one square mile.
- **WCRs with incorrect or without baseline meridian:** For WCRs that either did not provide a baseline meridian or provided an incorrect baseline meridian, the county location information was relied upon to locate the well to a county-section and assign a respective centroid. The spatial resolution in these cases was less than or equal to one square mile.
- **WCRs with incorrect or without county:** For WCRs that either did not provide a county or provided an incorrect county, the township-range-section and baseline meridian information was relied on to locate the well to a section and assign a respective centroid. The spatial

resolution in these cases was less than or equal to one square mile.

- **WCRs without township-range-section, baseline meridian, and county information**: All WCRs that did not provide township-range-section, baseline meridian, and county information were discarded from the analysis.

Part C – Estimating Number of Production Wells within a Basin

The total number of production wells in a basin was estimated by considering all the wells actually and potentially located in the basin. Wells assigned a centroid location were proportionally counted because the exact location of the wells was unknown. The process for proportionally counting wells is described below:

Step 1 – Map Wells using GIS Software: All wells with coordinates (absolute or section centroid coordinates) were mapped using Geographic Information System (GIS) software.

Step 2 – Sum Wells Wholly in Basin: Based on results from Step 1, if a well's absolute location or entire section's area associated with the centroid was wholly within a basin boundary, it was counted as one well.

Step 3 – Sum Wells Partially in Basin: Based on results from Step 1, if a section's area associated with the centroid was only partially located in a basin, all the wells within the section were proportionally counted based on the proportion of the spatial reference area located in the basin. For example, if only 50 percent of a section's spatial reference area was located in a basin, then all the wells in the section's spatial reference area were given a weighted value of 0.50 for that basin.

Step 4 – Calculate Total Number of Production Wells: The total number of production wells (Steps 2 and 3) in each basin was summed and then rounded down to the nearest whole number.

Part D – Determining the Basin Production Well Density

Once production well totals were calculated for each basin (Part C), the production well density was calculated by dividing the basin's total number of production wells by the basin's area (square mile).

Table 4 lists the priority points and associated ranges of production well density.

Table 4 Component 4: Priority Points and Ranges for Total Production Well Density

Priority Points	Production Well Density (x = production wells per square mile)
0	$x = 0$
1	$0 < x < 2$
2	$2 \leq x < 5$
3	$5 \leq x < 10$
4	$10 \leq x < 20$
5	$x \geq 20$

Component 5: The irrigated acreage overlying the basin or subbasin[13]

Data Source

- Statewide Crop Mapping 2014 (California Department of Water Resources 2014c)
- Verified local land use information received through public comment process

Process

The consideration of irrigated acreage as a component of the SGMA 2019 Basin Prioritization used the same methods with updated data relative to the CASGEM 2014 Basin Prioritization. The CASGEM 2014 Basin Prioritization used DWR Land Use mapping data to determine irrigated acres. However, the land use data represented multiple years of survey efforts throughout the State. For the SGMA 2019 Basin Prioritization, the Statewide Crop Mapping 2014 dataset was used to provide statewide coverage for a single year. The Statewide Crop Mapping 2014 dataset is a statewide, comprehensive field-level assessment of summer-season agriculture, managed wetlands, and urban boundaries for the 2014 year.

For the purposes of basin prioritization, all agriculture identified in the Statewide Crop Mapping 2014 dataset was identified as irrigated unless an agricultural field had been previously identified by DWR as dry-farmed. Only irrigated acreage inside the basin boundaries was included in the calculation and analysis. This was accomplished by overlying the spatial crop mapping data on groundwater basin boundaries to determine total agricultural field acreage overlying the basin.

The basin's irrigated acreage density was calculated by dividing the basin's total irrigated acreage by the basin's area (square mile).

Table 5 lists the priority points and associated ranges of density of irrigated acres.

Table 5 Component 5: Priority Points and Ranges for Density of Irrigated Acres

Priority Points	Density of Irrigated Acres (x = acres of irrigation per square mile)
0	$x < 1$
1	$1 \leq x < 25$
2	$25 \leq x < 100$
3	$100 \leq x < 200$
4	$200 \leq x < 350$
5	$x \geq 350$

[13] Water Code Section 10933(b)(5)

Component 6: The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water[14]

The groundwater reliance component in basin prioritization is comprised of two elements: total estimated groundwater use in the basin, referred to as Groundwater Use (sub-component 6.a), and the overall percent groundwater represents of the estimated total water use in the basin, referred to as Groundwater Reliance (sub-component 6.b).

Sub-component 6.a: Evaluating Volume of Groundwater Use

The consideration of groundwater use as a sub-component of the SGMA 2019 Basin Prioritization groundwater reliance component used updated methods and data relative to the CASGEM 2014 Basin Prioritization. The CASGEM 2014 Basin Prioritization used the DWR Agricultural model. For the SGMA 2019 Basin Prioritization, agricultural groundwater use was calculated by incorporating the crop types and total acreage from component 5 (above) into the California Simulation of Evapotranspiration of Applied Water (Cal-SIMETAW) v3.2 model (Morteza et al. 2013). The Cal-SIMETAW model was used for the SGMA 2019 Basin Prioritization to be consistent with the *California Water Plan Update 2018*. The model results were represented by evapotranspiration of applied water for each crop in the basin, representing total water demand not met by precipitation in Water Year 2014.

The updated process for this sub-component also included the use of Water Year 2014 (October 1, 2013 to September 30, 2014) data for both agricultural applied water and urban water used. Water Year 2014 was used because the Statewide Crop Mapping 2014 dataset was the best statewide land use information available at the time of analysis. The 2014 land use information also serves as a bench mark of water use prior to the enactment of SGMA.

The updated process for calculating urban groundwater use (Part B, below) included the use of local agency data provided in the SWRCB Public Water System Statistics (PWSS) database (California Department of Water Resources 2014d) and water purveyor boundaries.

Part A: Estimating Agricultural Groundwater Use

Data Source

- California Simulation of Evapotranspiration of Applied Water v3.2
- Statewide Crop Mapping 2014 (California Department of Water Resources 2014c)
- Irrigated Acres (component 5)
- Water balance data developed to support the California Water Plan
- Verified local agricultural information received through public comment process

Process

Agricultural groundwater use was estimated using the most recent Statewide Crop Mapping 2014 survey for land use acreages and the Cal-SIMETAW model, which incorporates local soil information, growth

[14] Water Code Section 10933(b)(6)

dates, crop coefficients, and evapotranspiration data from the Spatial California Irrigation Management Information System for water use demand estimates. Estimates were calculated using the following steps:

Step 1 – Determine Total Acres of Each Major Crop: The DWR Statewide Crop Mapping 2014 acreage data were overlaid on groundwater basin boundaries to determine the total acres of each DWR-defined major crop class (see Appendix 2) within the groundwater basins.

Step 2 – Determine Applied Water per Acre per Major Crop: The Cal-SIMETAW model was used to determine the volume of applied water for the DWR-defined major crop classes within the groundwater basins. Applied water per single acre of each DWR-defined major crop class was then estimated within each basin.

Step 3 – Calculate Total Applied Water for Each Crop: The estimates of applied water per single acre for each major crop class (Step 2) were multiplied by the total acres of DWR-defined major crop classes (Step 1) to estimate the total applied water for each crop class. The total applied water for each crop class was added to determine the total applied water for agriculture in the basin. The total applied water for each crop represents the combination of surface water and groundwater.

Step 4 – Calculate Total Groundwater Use: The total groundwater use (acre-feet) for the basin was estimated by multiplying the total applied water (Step 3) by the groundwater percentage of total applied water provided in the California Water Plan Update 2018.

Part B: Estimating Urban Groundwater Use

Data Source

- Public Water System Statistics (PWSS) database (California Department of Water Resources 2014d)
- Water purveyor boundaries (multiple sources)
- United States Department of Agriculture (USDA) National Agricultural Statistics Service CropScape and Cropland data layers (Urban portion) 2014
- Land Use surveys (Urban portion) (2000 through 2014)
- Groundwater Basin population data (2014)
- Verified local urban water use information received through public comment process

Process

Urban groundwater use was estimated within each groundwater basin using the data sources listed above. The data sources were processed using the following methods:

Step 1 - Determine Groundwater Basin Population: Actual census population block data and DOF population estimates are only available for years ending in a zero. DWR required 2014 population data to process the urban groundwater volumes. DWR accessed a third-party demographics software (Nielsen Claritas 2014) that estimated the population based on groundwater basin boundaries to determine the 2014 population.

Step 2 - Refine Water Purveyor Service Area: Service area boundaries were compiled using multiple sources including a DWR database, direct inquiries, and information included in Urban Water Management Plans. The service area boundaries were then refined based on the urban land use data (U.S. Department of Agriculture 2014; California Department of Water Resources 2000 through 2014) and overlaid on groundwater basin boundaries. The basin fraction value of the boundary that overlies each basin was used in subsequent steps.

Step 3 – Determine Population Served Within Groundwater Basin: Urban water purveyors' PWSS water use and population served data (California Department of Water Resources 2014d) were linked to their respective service area boundaries as refined in Step 2. The basin fraction value (Step 2) of the water purveyor boundary was applied to the total population served to determine the population served within the basin.

Step 4 - Determine Self-Supplied Population: The self-supplied population was determined by calculating the difference between population served in the basin (Step 3) and the basin population (Step 1).

Step 5 – Determine Water Purveyor Per-Capita Water Use: The water purveyors' PWSS water use and population served data were used to develop their respective per-capita water use.

Step 6 – Determine Groundwater Basin Per-Capita Water Use: The water purveyors that were identified as having all or part of their service area within a basin were used in this calculation. Each water purveyors' per-capita water use was averaged together using their respective population served and basin fraction value (Step 2).

Step 7 – Calculate Population-Based Water Use: Groundwater basin per-capita estimates (Step 6) were multiplied by the corresponding groundwater basin 2014 population (Step 1) to produce an estimated population-based urban water use. If the groundwater basin did not have any organized water purveyors, DWR provided an estimated average per-capita use to be used in the calculation.

Step 8a – Calculate Groundwater Use for Population Served by Water Purveyor: The urban water purveyors' PWSS data also reports the source of water used in their systems. DWR used this information along with the basin fraction value (Step 2) to calculate the basin's surface water and groundwater volume and the respective percent of total water supplied.

Step 8b – Calculate Groundwater Use for Self-Supplied Population: Self-supplied groundwater use was calculated by multiplying the per-capita value determined in Step 6 by the self-supplied population. DWR determined the source of supply for the self-supplied population to be groundwater in most cases.

Step 9 – Estimate Additional Groundwater Use: Additional urban water uses (such as golf courses, parks, and self-supplied industrial) were calculated if data were available from local sources such as Urban Water Management Plans.

Step 10 – Calculate Total Urban Groundwater Use: The groundwater amounts calculated in Steps 8a, 8b, and 9 were combined to obtain the total urban groundwater use.

Part C: Calculating Total Groundwater Use

Total groundwater use was calculated by adding agricultural groundwater use (Part A, Step 4) and urban groundwater use (Part B, Step 10). Basin groundwater use per acre was calculated for each basin by dividing the total acre-feet of groundwater use by the basin area (acres). Table 6 lists the points and associated ranges of groundwater use per acre.

Table 6 Component 6.a: Points and Ranges for Groundwater Use per Acre

Points	Groundwater Use per Acre (x = acre-ft / acre)
0	$x < 0.03$
1	$0.03 \leq x < 0.1$
2	$0.1 \leq x < 0.25$
3	$0.25 \leq x < 0.5$
4	$0.5 \leq x < 0.75$
5	$x \geq 0.75$

Sub-component 6.b: Evaluating Overall Supply Met by Groundwater

Data Source

- Sub-component 6.a

Process

The consideration of overall supply met by groundwater (percent) as a component of the SGMA 2019 Basin Prioritization used the same methods and updated data relative to the CASGEM 2014 Basin Prioritization.

After developing the total groundwater volume for the groundwater basin (see sub-component 6.a – Evaluation of Volume of Groundwater Use), the percentage of groundwater supply was derived as the ratio of total groundwater volume to total water use.

Step 1 – Calculate Total Groundwater Use: Agricultural groundwater use was added to urban groundwater use to determine the total groundwater use for each basin (sub-component 6.a, Part C).

Step 2 – Calculate Total Water Use: Agricultural applied water (surface water and groundwater) was added to urban total supply (surface water and groundwater) to determine total water used within each basin.

Step 3 – Calculate Percent of Total Water Supply Met by Groundwater: Total groundwater used (Step 1) was divided by total water used (Step 2) to calculate the groundwater portion of the total water supply.

Table 7 lists the points and associated ranges of percent of total water supply met by groundwater.

Table 7 Component 6.b: Points and Ranges for Percent of Total Water Supply Met by Groundwater

Points	Total Supply Met by Groundwater (x = Groundwater Percent)
0	x = 0
1	0 < x < 20
2	20 ≤ x < 40
3	40 ≤ x < 60
4	60 ≤ x < 80
5	x ≥ 80

Calculating the Total Priority Points for Groundwater Reliance

Priority Points for the degree to which persons overlying the basin rely on groundwater as their primary source of water was calculated by averaging the points for groundwater volume density (6.a) and percent of total water supply met by groundwater (6.b).

Average (6.a Points + 6.b Points) = Priority Points

Component 7: Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation[15]

Documented impacts on groundwater were analyzed for the SGMA 2019 Basin Prioritization using updated data and methods relative to the CASGEM 2014 Basin Prioritization. The CASGEM 2014 Basin Prioritization treated all four of the sub-components (overdraft, subsidence, saline intrusion, and other water quality degradation) as a single impact and assigned up to five priority points to the basin based on the effect of the combined documented impacts. The SGMA 2019 Basin Prioritization included separate evaluation of documented groundwater impacts for each of the four sub-components. Points were assigned based on the presence or absence of documented impacts for each sub-category, with the exception of water quality degradation for which points were assigned based on the magnitude and extent of the reported contaminant levels. The updated process is summarized below and described in detail in the following sections.

Each of the four sub-components of component 7 were assigned different maximum points based on the nature of the impact, and whether the impact was susceptible to avoidance or remediation through sustainable groundwater management practices, as follows:

- Basins with declining groundwater levels were assigned 7.5 points.
- Basins with current inelastic subsidence were assigned 10.0 points; basins with only historical inelastic subsidence were assigned 3.0 points.
- Basins with saline intrusion were assigned 5.0 points.
- Basins with water quality measurements that exceed maximum contaminant levels (MCLs)

[15] Water Code Section 10933(b)(7)

were assigned 1.0 to 3.0 points.

Sub-component 7.a: Documented Overdraft or Groundwater Level Decline

Data Source

Declining groundwater levels were evaluated by reviewing groundwater level data published over the last 20 years. Evaluation also consisted of reviewing available hydrographs; groundwater management plans; annual reports, such as from watermasters and urban water districts; grant applications submitted to DWR; professional studies; *Bulletin 118 – Update 2003*; *California Water Plan Update 2013* (California Department of Water Resources 2015); Alternatives submitted pursuant to SGMA; and published environmental documents.

Process

Based on available groundwater level data, hydrographs, or similar data for each basin, groundwater levels were classified as being stable, rising, or declining. To make this determination, each piece of data was viewed back in time as far as possible. In many cases, data limited the review time frames to six to ten years, while other data extended back 20 years or more. The entire basin did not have to show declining groundwater levels to be classified as having declining groundwater levels. In most cases, multiple hydrographs were used to support the overall basin determination concerning the status of groundwater levels.

Basins that exhibited declining groundwater levels were assigned 7.5 points.

Sub-component 7.b: Documented Subsidence

Data Source

Evaluation of inelastic subsidence consisted of reviewing hydrographs, extensometer data, and land use data; groundwater management plans submitted to DWR; annual reports, such as from watermasters and urban water districts; grant applications submitted to DWR; professional studies, including those from the NASA Jet Propulsion Laboratory and United State Geological Survey (USGS); Interferometric synthetic aperture radar via Sentinel-1A satellite maps; University NAVSTAR Consortium (UNAVCO) Plate Boundary Observatory graphs; *Bulletin 118 – Update 2003*; *California Water Plan Update 2013*; and environmental documents.

Process

Water Code Section 10933(b)(7) identifies inelastic subsidence as one of the four documented impacts DWR needs to consider under SGMA 2019 Basin Prioritization, to the extent data are available. Inelastic subsidence data related to groundwater extractions were evaluated to determine if inelastic subsidence was current or historical. To reach one of these determinations, data was viewed back in time as far as possible. In many cases the time frames were six to ten years for current conditions, while historical analyses required going back 20 years or more. When both historical and current inelastic subsidence was identified, only the current inelastic subsidence was considered for this sub-component.

Points were assigned based on the status of inelastic subsidence found in the basin:

- Basins with no observed inelastic subsidence were assigned 0 points.
- Basins with current inelastic subsidence were assigned 10 points.
- Basins with only historical inelastic subsidence were assigned 3 points.

Sub-component 7.c: Documented Saline Intrusion

Data Source

Saline intrusion was evaluated by reviewing available data published over the last 20 years. Evaluation consisted of reviewing hydrographs; groundwater management plans; annual reports, such as from watermasters and urban water districts; grant applications submitted to DWR; professional studies; *Bulletin 118 – Update 2003*; *California Water Plan Update 2013*; Alternatives submitted pursuant to SGMA; county hazards reports; and environmental documents.

Process

Saline intrusion in the coastal and Sacramento-San Joaquin Delta groundwater basins, as defined in *Bulletin 118 – Interim Update 2016,* was determined by researching available documents for references of past or current excess salinity problems.

The primary source of information used was local reports and studies that focused on the challenges of saline intrusion within individual basins. The reports and studies directed at managing or preventing saline intrusion were related to:

- Water quality analyses.
- Projects designed to stop or reverse current or past intrusions.
- Groundwater management re-operation that reduced or shifted current operations to other parts of the basin or invested in enhanced groundwater and surface water conjunctive management.

Basins with documented evidence of saline intrusion were assigned 5 points.

Sub-component 7.d: Documented Water Quality Degradation

Data Source

- SWRCB, Division of Drinking Water – Public Supply Database, all active wells (March 2016)
- SWRCB – GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) secure database (Division of Drinking Water, reported Water Quality results (as of April 4, 2017)
- SWRCB – Maximum Contaminant Level (MCL) list (as of November 2017)

Process

The SGMA 2019 Basin Prioritization followed a multi-part process to analyze water quality degradation in a basin. Initially, the water quality data maintained by the SWRCB Division of Drinking Water was used to conduct a statewide assessment of a range of water quality constituents. Data were analyzed using

the following methods:

- Water quality testing data were queried statewide in the GeoTracker GAMA secure database (State Water Resources Control Board 2017) for each constituent with a MCL (Appendix 3).
- Data with a sample date between January 1, 2000 and April 4, 2017 and a recorded constituent concentration were included in the evaluation.
- Each water quality sample record was assigned to a groundwater basin as defined in *Bulletin 118 – Interim Update 2016* using the well location data associated with each sample record in the GeoTracker GAMA database.
- Constituent concentrations were compared to MCLs, secondary MCLs, and Public Health Goals as defined in the California Code of Regulations Title 22 Division 4 Chapter 15. Records with instances of constituent concentrations that exceeded water quality criteria were retained for further evaluation.

Data were evaluated for both the magnitude of documented groundwater contamination and prevalence of impact to public drinking water and assigned points as described in sub-components 7.d.1 and 7.d.2, below. The next step in the analysis was to determine whether the basin had one or more of the documented impacts identified in component 7 (i.e. subsidence, declining groundwater levels, and saline intrusion), which are relevant because of the potential to exacerbate water quality degradation in the basin. The purpose of this analysis was to only include water quality impacts that are redressable through sustainable groundwater management practices.

Sub-component 7.d.1: Evaluating the Magnitude of Documented Groundwater Contamination

To compare the magnitude of groundwater contamination across multiple constituents with varying MCL values, the relative MCL exceedance was calculated for each sample record that exceeded the MCL value.

Step 1 – Calculate Relative MCL Exceedance for Each Constituent: The relative MCL exceedance was calculated by dividing the measured constituent concentration by the regulatory MCL value. For example, a data value that exceeded the regulatory MCL value by twice the limit would have a relative MCL exceedance of two.

Step 2 – Calculate Average Relative MCL Exceedance for Each Basin: For each basin, relative MCL exceedances for all constituents were averaged to generate an average relative MCL exceedance for the entire basin.

Table 8 lists the points and associated ranges of average relative MCL exceedance values for sub-component 7.d.1.

Table 8 Sub-component 7.d.1: Points and Ranges for Documented Impacts – Water Quality Degradation – Average Relative MCL Exceedance

Points	Average Relative MCL Exceedance X = Average Exceedance
0	$x \leq 1$
1	$1 < x < 2$
2	$2 \leq x < 3$
3	$3 \leq x < 4$
4	$4 \leq x < 6$
5	$x \geq 6$

Sub-component 7.d.2: Evaluating the Prevalence of Documented Groundwater Contamination

The prevalence of contamination in groundwater used as public drinking water in each basin was evaluated by dividing the number of unique wells with MCL exceedances within each basin by the number of public water supply wells in the basin (component 3). Because the selected water quality data set spanned the years 2000 to 2017, the actual number of public water supply wells in a basin would likely have varied as new wells went into service and other wells went offline, but this is common to all basins and not expected to skew the results. The number of public water supply wells calculated for component 3 was determined to most accurately represent the number of public water supply wells for the purposes of this evaluation.

An exception to this method was made if the water quality data indicated an MCL was exceeded, but no active public water supply wells were indicated from the component 3 assessment. In these cases, it was assumed that one public water supply well was present, or had been reactivated, in the basin, and the calculation of groundwater quality contamination proceeded as previously described.

The calculated value for the basin was then assigned points. Table 9 lists the points and associated ranges of values for sub-component 7.d.2.

Table 9 Sub-component 7.d.2: Points and Ranges for Documented Impacts – Water Quality Degradation – Prevalence of Groundwater Contamination

Points	Prevalence of Groundwater Contamination X = Value
0	$x = 0$
1	$0 < x < 0.5$
2	$0.5 \leq x < 0.75$
3	$0.75 \leq x < 1$
4	$x = 1$
5	$x > 1$

Sub-component 7.d: Calculating Total Points for Documented Water Quality Degradation

To obtain the points for documented water quality degradation, the points for average relative MCL exceedance (7.d.1) and points for prevalence of groundwater contamination (7.d.2) were combined; the total was then assigned points. Table 10 lists the points and associated range of water quality degradation values.

Table 10 Sub-component 7.d: Points and Ranges for Documented Impacts – Water Quality Degradation

Points	Documented Impacts – Water Quality Degradation X = Water Quality Points
0	$x < 3$
1	$3 \leq x < 6$
2	$6 \leq x < 8$
3	$x \geq 8$

Calculating the Total Priority Points for Documented Impacts

After each of the four types of documented impacts were assigned a value, the cumulative total of points was calculated. Based on the cumulative total of points assigned for all categories of documented impacts, the basin was assigned priority points as indicated in Table 11.

Table 11 Component 7: Priority Points and Ranges for Documented Impacts – Cumulative Total

Priority Points	Cumulative Total – Documented Impacts
0	$x \leq 3$
1	$3 < x < 7$
2	$7 \leq x < 11$
3	$11 \leq x < 15$
4	$15 \leq x < 19$
5	$x \geq 19$

Component 8: Any other information determined to be relevant by the department, including adverse impacts on local habitat and local streamflows[16]

Sub-component 8.a: Adverse Impacts on Local Habitat and Local Streamflows

Adverse impacts on local habitat and local streamflows were not evaluated or required to be evaluated for the CASGEM 2014 Basin Prioritization. The SGMA 2019 Basin Prioritization used the methods and sources described below.

[16] Water Code Section 10933(b)(8)

Data Source

- Natural Communities Commonly Associated with Groundwater (Natural Communities) Dataset
- USGS National Hydrography Dataset (NHD)
- Basin Prioritization 2018 Volume of Groundwater Use (sub-component 6.a)
- Basin Prioritization 2018 Documented Impacts (sub-component 7.a)

Adverse impacts on local habitat and local streamflows were identified by the legislature as an example of information relevant to basin prioritization.[17] Impacts to habitat and streamflow are significant factors in the prioritization of basins for the purposes of sustainable groundwater management because such impacts could indicate the depletion of interconnected surface waters, which has significant and unreasonable adverse impacts on beneficial uses of the surface water.[18] In the case of adverse impacts on local habitat and local streamflows, DWR determined that there was not sufficient consistent, reliable, statewide information available for the initial SGMA 2015 Basin Prioritization. After the initial SGMA 2015 Basin Prioritization, DWR developed a statewide Natural Communities dataset that assembled information on the location of seeps, springs, wetlands, rivers, vegetation alliances, and habitat from multiple data sources. Utilizing that dataset, DWR determined sufficient data are available to include impacts to local habitat and local streamflows as a prioritization sub-component.

The following process was used to determine if there is a possibility of adverse impacts on local habitat and local streamflow occurring within the basin.

Process

For the SGMA 2019 Basin Prioritization, DWR evaluated if habitat or streams exist in the basin. To do so, DWR used the Natural Communities and NHD datasets (California Department of Water Resources 2018b; United States Geological Survey 2016) to determine if one or more habitats commonly associated with groundwater or perennial or permanent streams exist within a groundwater basin. Habitat and streams were identified within the basins using the following method:

Method	Points
After consulting the Natural Communities dataset, are there one or more polygons representing vegetation, wetland, seep, or spring habitat in the basin?	No = 0 points Yes = 1 Habitat point
After consulting the NHD dataset, was it determined that one or more perennial or permanent streams are located within or adjacent to the basin?	No = 0 points Yes = 1 Streamflow point

If there was no habitat or streamflow identified in the basin, then zero priority points were assigned to subcomponent 8.a.

[17] Water Code Section 10933(b)(8)

[18] Water Code Section 10721(x)(6)

Part B: Determining if Potential Adverse Impacts on Habitat and Streamflow are Occurring in the Basin

The habitat and/or streamflow point(s) were not applied to basin prioritization until it was determined that one or more of the habitats and/or streams were potentially being adversely impacted. No statewide measure of adverse impacts to habitat or streamflow exists that would allow DWR to rank the severity of those impacts. Potential adverse impacts to habitat and streamflow resulting from groundwater activities were determined by evaluating the amount of groundwater pumping and groundwater level monitoring occurring in each basin.

- **Groundwater Monitoring Occurs in the Basin**: If the basin's groundwater use (acre-feet/acre) (sub-component 6.a) exceeded 0.16 acre-feet/acre and groundwater level monitoring indicated that groundwater levels were declining (sub-component 7.a), then the habitat and streamflow points assigned in Part A were applied to the basin's priority points.

  Or

- **Groundwater Monitoring Does Not Occur in the Basin:** If the basin's groundwater use (acre-feet/acre) (sub-component 6.a) exceeded 0.16 acre-feet/acre and groundwater level monitoring was not being performed in the basin, the habitat and streamflow point(s) assigned in Part A were applied to the basin's priority points.

Part C: Documenting Adverse Habitat and Streamflow Impacts

If the results from Part B indicated that there were no potential adverse impacts to habitat or streamflow in the basin, but documentation indicated that habitat and/or streamflow were being adversely impacted by groundwater activities in the basin, the habitat and/or streamflow priority point(s) assigned in Part A were applied to the basin's priority points. Documentation reviewed included, but was not limited to, groundwater levels, hydrologic models, hydrologic studies, and court judgements.

Sub-component 8.b – Basin-level Evaluation of "other information determined to be relevant by the department"

The basin-level evaluation of "other information determined to be relevant by the department" as an element of the SGMA 2019 Basin Prioritization used the same analysis method and updated data relative to the CASGEM 2014 Basin Prioritization.

Each basin was reviewed based on the individual basin's hydrology, geology, land use, and challenges to determine if there are groundwater-related actual or potential impacts to unique features or actual or potential challenges for groundwater management within the basin. Basins with actual or potential impacts to unique features that could result in an unrecoverable loss, and basins facing groundwater management challenges that could be serious enough to impact the sustainability of the basin if the necessary groundwater management is not applied to the basin, were assigned three priority points. If these conditions did not apply, the basin was assigned zero priority points.

Sub-components 8.c and 8.d: Statewide-level Evaluation of "other information determined to be relevant by the department"

Sub-components 8.c and 8.d evaluations were applied uniformly to all basins during the prioritization process and included additional analysis of conditions that, if present, caused basin priority points to be adjusted, regardless of the accumulated priority points from components 1 through 8.b. The sections below (sub-components 8.c.1 through 8.d.2) describe the conditions analyzed prior to the prioritization. The purpose of this analysis was to evaluate other information that was determined to be relevant by DWR. Beginning with sub-component 8.c.1, the analyses were performed in the order listed in Table 12 until a condition was met. After the result was applied, the additional conditions analysis stopped, and the processing continued to section VI – Basin Priority below. Table 12 describes the basin to which the analysis was applied, the condition that was analyzed, and the resulting priority points.

Table 12 Sub-components 8.c and 8.d: Additional Conditions Analyzed Prior to Priority Determination

Sub-Component	Basin Applicability	Condition	If True, Result
8.c.1	All	Less than or equal to 2,000 acre-feet of groundwater use for water year 2014	Total Priority Points = 0
8.c.2	All	Greater than 2,000 and less than or equal to 9,500 acre-feet of groundwater use for water year 2014 with no documented impacts	Total Priority Points = 0
8.c.3	Basins with Adjudications	Basin's non-adjudicated portion extracts less than or equal to 9,500 acre-feet of groundwater for water year 2014	Total Priority Points = 0
8.d.1	Critically Overdrafted basins	Basin considered to be in Critical Overdraft per Bulletin 118 – Interim Update 2016	Total Priority Points = 40
8.d.2	All	Groundwater-related transfers (groundwater substitution transfers, out-of-basin groundwater transfers not part of adjudicated activities) are greater than 2,000 acre-feet in any given year since 2009	Add 2 Priority Points

The analyses above were performed in the order listed in Table 12 and only continued until they reached a condition where the result was true. When the true condition was reached, the remaining analysis steps listed in Table 12 were bypassed and the processing for the basin proceeded to Basin Priority with the adjusted priority points. The points accumulated during analysis of components 1 through 8.b were retained.

If a basin that did not meet a true condition for sub-components 8.c or 8.d listed in Table 12, the basin was prioritized based on the accumulated priority points from components 1 through 8.b.

Sub-component 8.c.1: Does the Basin or Subbasin Use Less Than or Equal to 2,000-acre feet of Groundwater?

Data Source

- Basin Prioritization 2018 Volume of Groundwater Use (sub-component 6.a)

Process

The consideration of "Does the basin use less than or equal to 2,000-acre feet of groundwater?" as an element of the SGMA 2019 Basin Prioritization used the same method and updated data relative to the CASGEM 2014 Basin Prioritization.

Using an approach similar to the GAMA Program, DWR selected the groundwater volume portion of the groundwater reliance component data (sub-component 6.a) as the primary component for the initial review and screening in the groundwater basin prioritization process. DWR considers any basin that uses less than or equal to 2,000 acre-feet of groundwater per year to be low priority with respect to sustainable groundwater management. Total priority points were adjusted to zero for basins that pump less than or equal to 2,000 acre-feet of groundwater per year.

Sub-component 8.c.2: Does the Basin Use Greater Than 2,000-acre feet and Less Than or Equal to 9,500-acre feet AND Have No Documented Impacts (component 7 and 8)?

Data Source

- Basin Prioritization 2018 Volume of Groundwater Use (sub-component 6.a)
- Basin Prioritization 2018 Documented Impacts (component 7)
- Basin Prioritization 2018 Any other information determined to be relevant by the department, including adverse impacts on local habitat and local streamflows (sub-components 8.a and 8.b)

Process

The consideration of "Does the basin use greater than 2,000-acre feet and less than or equal to 9,500-acre feet and have no documented impacts?" in water year 2014 as an element of the SGMA 2019 Basin Prioritization used the same method and updated data relative to the CASGEM 2014 Basin Prioritization.

Step 1 – Check How Much Groundwater is Pumped: If the basin's groundwater use volume (6.a) was greater than 2,000 and less than or equal to 9,500 acre-feet in water year 2014, the analysis proceeded to Step 2. Otherwise, sub-component 8.c.2 did not apply to the basin.

Step 2 – Check if Documented Impacts Exist: If the basin did not have any of the documented impacts listed below, the analysis proceeded to Step 3. Otherwise, sub-component 8.c.2 did not apply to the basin.

1. Documented impacts (component 7)
2. Documented adverse impacts to habitat and streamflow (sub-component 8.a, Part C)
3. Other basin-specific impacts or challenges (sub-component 8.b)

Step 3 – Assign Priority Points: If the basin met the criteria of Step 1 and Step 2, the basin's priority points were adjusted to zero.

Sub-component 8.c.3: For Basins That Have Adjudicated Area Within the Basin, Does the Basin's Non-Adjudicated Portion Pump Less Than or Equal To 9,500-acre feet of Groundwater?

Data Source

- California Department of Water Resources2018 Adjudicated Areas (shapefile)
- Basin Prioritization Groundwater Volume for non- adjudicated area or areas of basin, 2018 (Appendix 4)
- Basin Prioritization 2010 Population for non-adjudicated area or areas, 2018

With the exception of an annual reporting requirement, SGMA does not apply to the adjudicated areas identified in the Act. Because these adjudicated areas are not required to develop and adopt a GSP or Alternative, DWR determined that SGMA prioritization should evaluate those portions of the basin that are non-adjudicated. The non-adjudicated areas remain subject to SGMA, but DWR evaluated the non-adjudicated portion of the basin to determine the extent that these areas are independently significant based on the prioritization criteria developed for an entire basin, or to determine the potential to affect groundwater management in the entire basin, in accordance with the consideration of components 1 through 8 of Water Code Section 10933(b).

Process

The results of the SGMA 2019 Basin Prioritization were based on the analysis of the entire basin, including the adjudicated area. If the basin was determined to be medium or high priority under the SGMA 2019 Basin Prioritization, the full requirements of SGMA only applies to the non-adjudicated portion of the basin. Appendix 5 provides a complete listing of the 37 basins that are covered completely or partially by adjudicated areas.

The adjudication analysis was only performed on basins with adjudicated areas (Appendix 5) and was only applied to the portion or combined portions of the basin that are not covered by a groundwater adjudication. The following steps were applied when evaluating sub-component 8.c.3:

Step 1 – Create Shapefile: A shapefile was created to represent the non-adjudicated portion or portions of the basins listed in Appendix 5 by cutting out the portion(s) of the basin that are adjudicated.

Step 2 – Calculate Urban Groundwater Use: Using the shapefile from Step 1, the 2010 population in the non-adjudicated portion or portions was determined, and the urban water demands and ultimately the urban groundwater volume was processed, as calculated for sub-component 6.a.

Step 3 – Calculate Agricultural Groundwater Use: Using the shapefile from Step 1, the 2014 land use in the non-adjudicated portion or portions was determined and the agricultural water demand and groundwater volume were processed, as calculated for sub-component 6.a.

Step 4 – Calculate Total Groundwater Use: The urban (Step 2) and agricultural (Step 3) groundwater use amounts were combined to establish the total groundwater used in the non-adjudicated portion of the basin (see Appendix 4).

Step 5 – Determine Priority Points: If the groundwater volume computed in Step 4 was less than or equal to 9,500-acre feet per year, the basin total priority points were adjusted to zero.

Sub-component 8.d.1: Is the Basin Considered to be in Critical Overdraft?

Data Source

- Bulletin 118 - Interim Update 2016, Table 2

Critically overdrafted basins were analyzed for the SGMA 2019 Basin Prioritization using updated methods and data relative to the CASGEM 2014 Basin Prioritization. Critical conditions of overdraft have been identified in 21 groundwater basins as described in *Bulletin 118 – Interim Update 2016*.[19] A basin is subject to critical conditions of overdraft when continuation of current water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts.[20] Additionally, chronic lowering of groundwater levels (indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon) is an undesirable result.[21] For these reasons, DWR has determined that critical overdraft of a basin is a relevant factor in the prioritization of basins for the purposes of achieving sustainable groundwater management.

The SGMA 2019 Basin Prioritization process flagged each of the 21 basins in critical overdraft, as determined in *Bulletin 118 – Interim Update 2016*, and adjusted the overall basin priority points for these basins by assigning the maximum total priority points of 40.

Sub-component 8.d.2: Does the Basin Participate in Groundwater-Related Transfers?

Data Source

- Bulletin 132 - Management of the California State Water Project

Groundwater-related transfers (groundwater substitution transfers and out-of-basin groundwater transfers) were not evaluated as part of the CASGEM 2014 Basin Prioritization. Groundwater-related transfers were deemed relevant to basin prioritization for the purposes of achieving sustainable groundwater management and were analyzed for the SGMA 2019 Basin Prioritization. Groundwater-related transfers, if unmanaged, could lead to impacts to groundwater levels and interconnected surface water, and subsidence, among others. Groundwater-related transfers were considered significant if they exceeded 2,000 acre-feet of groundwater-related transfers or exports from a basin in a single year, which was the threshold utilized in the CASGEM 2014 Basin Prioritization for a basin to be classified as very low priority.

[19] Water Code Section 12924

[20] Bulletin 118 – Update 2003

[21] Water Code Section 10721(x)(1)

The consideration of groundwater-related transfers (groundwater substitution transfers or out-of-basin groundwater transfers) included reviewing groundwater substitution records since 2009. Data from the most recent (10) years is consistent with the Water Budget requirements within the GSP regulation.[22]

The two types of groundwater transfer are described as follows:

- *Groundwater substitution transfers* occur when surface water is made available for transfer by reducing surface water diversions and replacing that water with groundwater pumping. The rationale is that surface water demands are reduced because a like amount of groundwater is used to meet the demands. The resulting increase in available surface water supplies can be transferred to other users. DWR only considered those groundwater substitution transfers that are out-of-basin. The SGMA 2019 Basin Prioritization refers to these transfers as Type A.
- *Out-of-basin groundwater transfers* are transfers that pump percolating groundwater from a source basin and convey the pumped water to a location outside the source basin. DWR only considered groundwater transfers that are or would be under the decision-making authority of a GSA. Transfers pursuant to a groundwater adjudication were not considered. The SGMA 2019 Basin Prioritization refers to these transfers as Type B.

Groundwater-related transfers were evaluated by reviewing available data published annually from 2009 through 2015 in DWR *Bulletin 132: Management of the California State Water Project* (California Department of Water Resources 2009 through 2015). Additionally, SGMA watermaster annual reports, basin annual reports, and hydrologic studies were consulted to determine if groundwater-related transfers occurred.

Appendix 6 identifies the basins that participate in Type A or Type B groundwater transfers and volume of groundwater pumped in years with transfers.

Basins shown in Appendix 6 were evaluated using the following steps for sub-component 8.d.2:

Step 1 – Determine Maximum Groundwater Pumped: Using Appendix 6, the maximum groundwater volume pumped to meet the requirements of groundwater substitution transfers or groundwater exports out of basin in any year since 2009 was determined.

Step 2 – Check Groundwater Pumped: If the groundwater pumped was greater than 2,000 acre-feet, the analysis proceeded to Step 3. Otherwise, sub-component 8.d.2 did not apply to the basin.

Step 3 – Assign Priority Points: The basin was assigned two priority points for sub-component 8.d.2.

Step 4 – Adjust Sub-Component 6.a: Volume of groundwater pumped in 2014 for groundwater substitution transfers or out-of-basin groundwater transfers was added to the overall groundwater ("other" groundwater) in sub-component 6a. For groundwater substitution transfers, the equal volume was subtracted from the overall surface water ("other" surface water).

[22] California Code of Regulations 354.18

VI. Basin Priority

All basins were processed for all eight components. Prior to determining the basins' priority, adjustments were made, as described above (see sub-components 8c and 8d), that would automatically result in a very low or high priority determination. In cases where basins were automatically assigned very low or high priority, the calculation of priority points was completed and retained.

The basin priority determination for each basin as an element of the SGMA 2019 Basin Prioritization used the same data and an updated method relative to the CASGEM 2014 Basin Prioritization. For the CASGEM 2014 Basin Prioritization, the threshold value between low and medium priority was set at 13.42 and was based on a maximum of 40 points. For the SGMA 2019 Basin Prioritization, DWR adjusted the threshold value to account for the two additional points added for the adverse impacts on local habitat and local streamflow (sub-component 8.a). The approach was a simple ratio calculation that increased the medium priority threshold value to 14.1.

The total possible points for the SGMA 2019 Basin Prioritization range from zero to 42 in increments of 0.5 points. The new priority threshold value for medium priority was set to greater than 14. The other threshold values were evenly distributed from the 14-point value in multiples of 7. The basin priority ranks were determined using the value ranges listed in Table 13, including basins that had their total priority points adjusted to zero (very low) or 42 (high).

Table 13 SGMA 2019 Basin Prioritization Priority Based on Total Priority Points

Priority	Total Priority Point Ranges X = Cumulative Priority Points
Very Low	$0 \leq x \leq 7$
Low	$7 < x \leq 14$
Medium	$14 < x \leq 21$
High	$21 < x \leq 42$

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DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

Appendix 1 – Summary of SGMA 2019 Basin Prioritization Results

Phase 1, Final January 2019: 458 basins (Figure A-1 and Table A-1)

- High priority - 25 basins
- Medium priority - 31 basins
- Low priority – 9 basins
- Very Low priority – 393 basins

Phase 2, Draft April 2019: 57 basins (Figure A-2 and Table A-2)

- High priority - 22 basins
- Medium priority - 16 basins
- Low priority – 2 basins
- Very Low priority – 17 basins

Basins newly identified as high- or medium-priority in the SGMA 2019 Basin Prioritization are required to form a GSA within two years from the date the basin's priority is finalized and are required to submit a GSP five years from the same finalization date.

DWR created a web application that spatially and graphically presents the SGMA 2019 Basin Prioritization data and results for each basin. This application can be accessed at https://gis.water.ca.gov/app/bp2018-dashboard. Additional information related to SGMA 2019 Basin Prioritization can be accessed at: https://www.water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization.

Figure A-1 Statewide Map of SGMA 2019 Basin Prioritization Results, Phase 1 Final

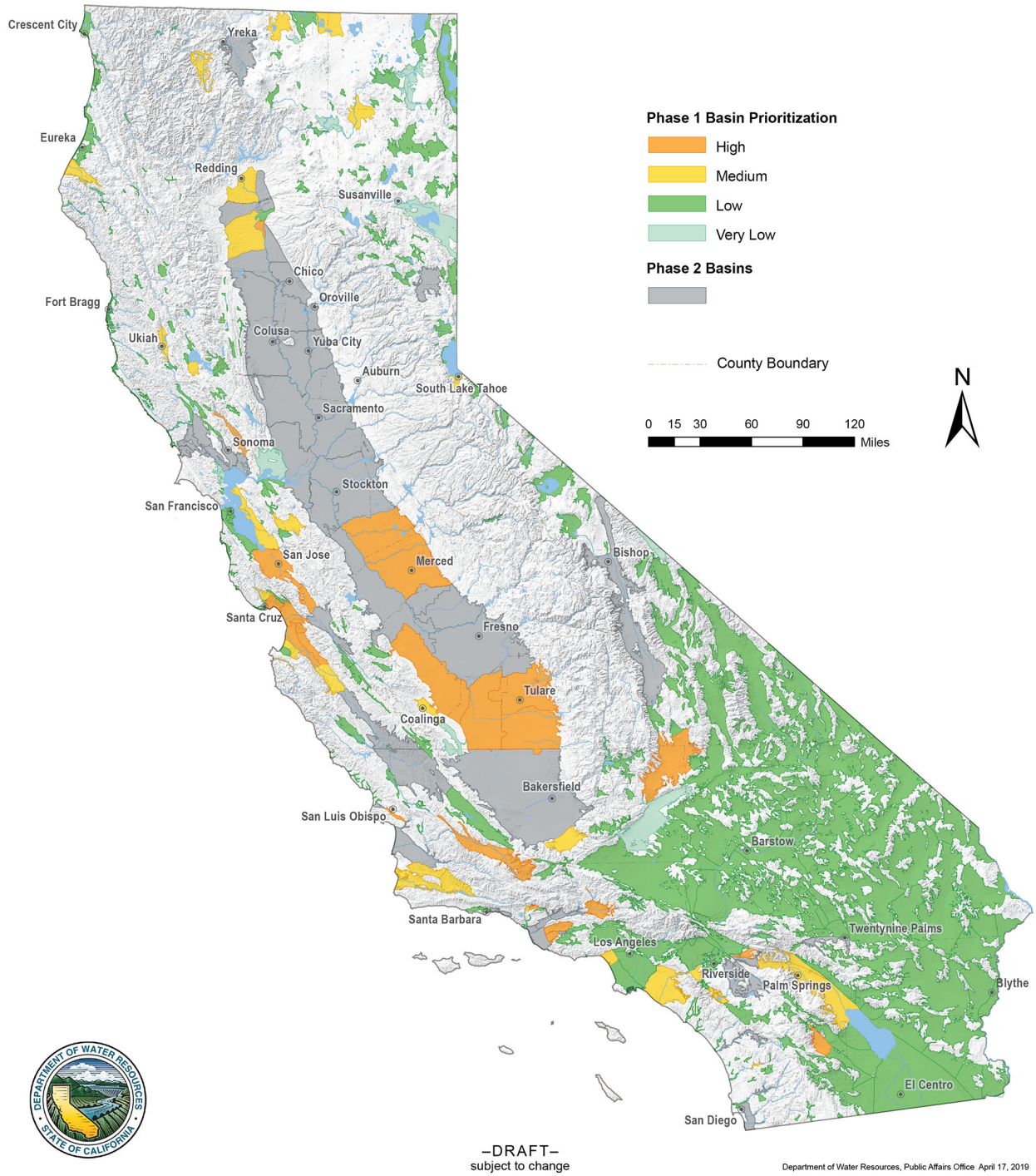

Table A-1 Statewide SGMA 2019 Basin Prioritization Results, Phase 1 Final

SGMA 2019 Basin Prioritization Phase 2 basins and their draft results will be listed in Table A-2.

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
1-001	Smith River Plain	40,434.5	63.2	Very Low
1-002.01	Tulelake	110,521.4	172.7	Medium
1-002.02	Lower Klamath	75,330.3	117.7	Very Low
1-003	Butte Valley	79,739.0	124.6	Medium
1-004	Shasta Valley			See Table A-2
1-005	Scott River Valley	63,831.4	99.7	Medium
1-006	Hayfork Valley	3,297.5	5.2	Very Low
1-007	Hoopa Valley	3,897.2	6.1	Very Low
1-008.01	Mad River Lowland	24,663.2	38.5	Very Low
1-008.02	Dows Prairie School Area	15,416.1	24.1	Very Low
1-009	Eureka Plain	38,795.4	60.6	Very Low
1-010	Eel River Valley	72,956.7	114.0	Medium
1-011	Covelo Round Valley	16,408.9	25.6	Very Low
1-012	Laytonville Valley	5,023.7	7.8	Very Low
1-013	Little Lake Valley	10,025.5	15.7	Very Low
1-014	Lower Klamath River Valley	7,022.1	11.0	Very Low
1-015	Happy Camp Town Area	2,773.3	4.3	Very Low
1-016	Seiad Valley	2,245.1	3.5	Very Low
1-017	Bray Town Area	8,032.4	12.6	Very Low
1-018	Red Rock Valley	9,000.7	14.1	Low
1-019	Anderson Valley	4,972.8	7.8	Very Low
1-020	Garcia River Valley	2,199.5	3.4	Very Low
1-021	Fort Bragg Terrace Area	23,897.8	37.3	Very Low
1-022	Fairchild Swamp Valley	3,277.9	5.1	Very Low
1-025	Prairie Creek Area	20,848.8	32.6	Very Low
1-026	Redwood Creek Area	2,009.4	3.1	Very Low
1-027	Big Lagoon Area	13,217.0	20.7	Very Low
1-028	Mattole River Valley	3,160.0	4.9	Very Low
1-029	Honeydew Town Area	2,369.9	3.7	Very Low
1-030	Pepperwood Town Area	6,292.0	9.8	Very Low
1-031	Weott Town Area	3,655.2	5.7	Very Low
1-032	Garberville Town Area	2,113.2	3.3	Very Low
1-033	Larabee Valley	967.2	1.5	Very Low
1-034	Dinsmores Town Area	2,277.9	3.6	Very Low
1-035	Hyampom Valley	1,354.8	2.1	Very Low
1-036	Hettenshaw Valley	847.0	1.3	Very Low
1-037	Cottoneva Creek Valley	762.1	1.2	Very Low
1-038	Lower Laytonville Valley	2,153.1	3.4	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
1-039	Branscomb Town Area	1,382.1	2.2	Very Low
1-040	Ten Mile River Valley	1,491.3	2.3	Very Low
1-041	Little Valley	812.5	1.3	Very Low
1-042	Sherwood Valley	1,150.7	1.8	Very Low
1-043	Williams Valley	1,643.4	2.6	Very Low
1-044	Eden Valley	1,377.5	2.2	Very Low
1-045	Big River Valley	1,685.9	2.6	Very Low
1-046	Navarro River Valley	768.5	1.2	Very Low
1-048	Gravelly Valley	2,976.3	4.7	Very Low
1-049	Annapolis Ohlson Ranch Fm Highlands	8,653.0	13.5	Very Low
1-050	Knights Valley	4,089.5	6.4	Very Low
1-051	Potter Valley	8,243.0	12.9	Very Low
1-052	Ukiah Valley	37,537.4	58.7	Medium
1-053	Sanel Valley	5,572.4	8.7	Very Low
1-054.01	Alexander Area	24,484.4	38.3	Very Low
1-054.02	Cloverdale Area	6,530.1	10.2	Very Low
1-055.01	Santa Rosa Plain			See Table A-2
1-055.02	Healdsburg Area	15,412.7	24.1	Very Low
1-055.03	Rincon Valley	5,553.2	8.7	Very Low
1-056	Mcdowell Valley	1,487.6	2.3	Very Low
1-057	Bodega Bay Area	2,668.7	4.2	Very Low
1-059	Wilson Grove Formation Highlands			See Table A-2
1-060	Lower Russian River Valley	6,645.0	10.4	Very Low
1-061	Fort Ross Terrace Deposits	8,360.9	13.1	Very Low
1-062	Wilson Point Area	710.0	1.1	Very Low
2-001	Petaluma Valley			See Table A-2
2-002.01	Napa Valley	45,928.2	71.8	High
2-002.02	Sonoma Valley			See Table A-2
2-002.03	Napa-Sonoma Lowlands			See Table A-2
2-003	Suisun-Fairfield Valley	133,586.2	208.7	Low
2-004	Pittsburg Plain	11,613.3	18.1	Very Low
2-005	Clayton Valley	17,846.6	27.9	Very Low
2-006	Ygnacio Valley	15,469.0	24.2	Very Low
2-007	San Ramon Valley	7,057.4	11.0	Very Low
2-008	Castro Valley	1,821.7	2.8	Very Low
2-009.01	Niles Cone	65,214.5	101.9	Medium
2-009.02	Santa Clara	189,581.0	296.2	High
2-009.03	San Mateo Plain	37,865.0	59.2	Very Low
2-009.04	East Bay Plain	71,315.1	111.4	Medium
2-010	Livermore Valley	69,567.1	108.7	Medium
2-011	Sunol Valley	16,632.0	26.0	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
2-019	Kenwood Valley	5,139.0	8.0	Very Low
2-022	Half Moon Bay Terrace	9,155.9	14.3	Very Low
2-024	San Gregorio Valley	1,074.9	1.7	Very Low
2-026	Pescadero Valley	2,912.4	4.6	Very Low
2-027	Sand Point Area			See Table A-2
2-028	Ross Valley	1,764.7	2.8	Very Low
2-029	San Rafael Valley	874.8	1.4	Very Low
2-030	Novato Valley	20,535.1	32.1	Low
2-031	Arroyo Del Hambre Valley	786.3	1.2	Very Low
2-032	Visitacion Valley	5,831.1	9.1	Very Low
2-033	Islais Valley	5,941.3	9.3	Very Low
2-035	Westside	25,392.4	39.7	Very Low
2-036	San Pedro Valley	710.4	1.1	Very Low
2-037	South San Francisco	2,176.5	3.4	Very Low
2-038	Lobos	2,360.8	3.7	Very Low
2-039	Marina	2,187.7	3.4	Very Low
2-040	Downtown	7,640.1	11.9	Very Low
3-001	Santa Cruz Mid-County	36,289.7	56.7	High
3-002.01	Pajaro Valley	75,055.1	117.3	High
3-002.02	Purisima Highlands	12,932.0	20.2	Very Low
3-003.01	Llagas Area	47,370.9	74.0	High
3-003.02	Bolsa Area			See Table A-2
3-003.03	Hollister Area			See Table A-2
3-003.04	San Juan Bautista Area			See Table A-2
3-004.01	180/400 Foot Aquifer	89,706.3	140.2	High
3-004.02	East Side Aquifer	57,474.3	89.8	High
3-004.04	Forebay Aquifer	94,052.2	147.0	Medium
3-004.05	Upper Valley Aquifer			See Table A-2
3-004.06	Paso Robles Area			See Table A-2
3-004.08	Seaside Area	14,488.7	22.6	Very Low
3-004.09	Langley Area	17,618.5	27.5	High
3-004.10	Corral De Tierra Area	30,854.9	48.2	Medium
3-004.11	Atascadero Area	19,734.9	30.8	Very Low
3-005	Cholame Valley	39,824.6	62.2	Very Low
3-006	Lockwood Valley	59,941.0	93.7	Very Low
3-007	Carmel Valley	4,321.7	6.8	Medium
3-008	Los Osos Valley			See Table A-2
3-009	San Luis Obispo Valley	12,720.6	19.9	High
3-012	Santa Maria			See Table A-2
3-013	Cuyama Valley	241,729.9	377.7	High
3-014	San Antonio Creek Valley	67,437.4	105.4	Medium

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
3-015	Santa Ynez River Valley	203,050.6	317.3	Medium
3-016	Goleta	9,217.1	14.4	Very Low
3-017	Santa Barbara	6,183.1	9.7	Very Low
3-018	Carpinteria			See Table A-2
3-019	Carrizo Plain	210,627.5	329.1	Very Low
3-020	Ano Nuevo Area	1,995.2	3.1	Very Low
3-022	Santa Ana Valley	2,724.3	4.3	Very Low
3-023	Upper Santa Ana Valley	1,430.9	2.2	Very Low
3-024	Quien Sabe Valley	4,707.0	7.4	Very Low
3-025	Tres Pinos Valley			See Table A-2
3-026	West Santa Cruz Terrace	7,306.4	11.4	Very Low
3-027	Santa Margarita	22,249.0	34.8	Medium
3-028	San Benito River Valley	24,227.0	37.9	Very Low
3-029	Dry Lake Valley	1,416.3	2.2	Very Low
3-030	Bitter Water Valley	32,224.8	50.4	Very Low
3-031	Hernandez Valley	2,864.5	4.5	Very Low
3-032	Peach Tree Valley	9,790.0	15.3	Very Low
3-033	San Carpoforo Valley	1,042.6	1.6	Very Low
3-034	Arroyo De La Cruz Valley	1,015.9	1.6	Very Low
3-035	San Simeon Valley	547.0	0.9	Very Low
3-036	Santa Rosa Valley	3,507.5	5.5	Very Low
3-037	Villa Valley	1,355.9	2.1	Very Low
3-038	Cayucos Valley	333.5	0.5	Very Low
3-039	Old Valley	1,178.4	1.8	Very Low
3-040	Toro Valley	720.0	1.1	Very Low
3-041	Morro Valley	644.1	1.0	Very Low
3-042	Chorro Valley	1,549.6	2.4	Very Low
3-043	Rinconada Valley	2,577.8	4.0	Very Low
3-044	Pozo Valley	6,848.6	10.7	Very Low
3-045	Huasna Valley	4,703.0	7.3	Very Low
3-046	Rafael Valley	2,993.2	4.7	Very Low
3-047	Big Spring Area	7,324.1	11.4	Very Low
3-049	Montecito			See Table A-2
3-051	Majors Creek	478.7	0.7	Very Low
3-052	Needle Rock Point	839.9	1.3	Very Low
3-053	Foothill	3,282.3	5.1	Very Low
4-001	Upper Ojai Valley	3,806.3	5.9	Very Low
4-002	Ojai Valley	5,913.4	9.2	High
4-003.01	Upper Ventura River	5,278.1	8.2	Medium
4-003.02	Lower Ventura River	5,262.1	8.2	Very Low
4-004.02	Oxnard			See Table A-2

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
4-004.03	Mound			See Table A-2
4-004.04	Santa Paula			See Table A-2
4-004.05	Fillmore			See Table A-2
4-004.06	Piru			See Table A-2
4-004.07	Santa Clara River Valley East	67,687.6	105.8	High
4-005	Acton Valley	8,268.4	12.9	Very Low
4-006	Pleasant Valley	19,840.0	31.0	High
4-007	Arroyo Santa Rosa Valley			See Table A-2
4-008	Las Posas Valley	44,622.0	69.7	High
4-009	Simi Valley	12,155.2	19.0	Very Low
4-010	Conejo	18,796.0	29.4	Very Low
4-011.01	Santa Monica	31,779.2	49.7	Medium
4-011.02	Hollywood	10,070.2	15.7	Very Low
4-011.03	West Coast	92,996.7	145.3	Very Low
4-011.04	Central	177,770.3	277.8	Very Low
4-012	San Fernando Valley	144,837.1	226.3	Very Low
4-013	San Gabriel Valley	126,379.0	197.5	Very Low
4-015	Tierra Rejada	4,597.8	7.2	Very Low
4-016	Hidden Valley	2,210.7	3.5	Very Low
4-017	Lockwood Valley	21,789.5	34.0	Very Low
4-018	Hungry Valley	5,309.2	8.3	Very Low
4-019	Thousand Oaks Area	3,106.0	4.9	Very Low
4-020	Russell Valley	3,078.3	4.8	Very Low
4-022	Malibu Valley	610.8	1.0	Very Low
4-023	Raymond	26,048.8	40.7	Very Low
5-001.01	Goose Valley	35,954.4	56.2	Very Low
5-001.02	Fandango Valley	18,443.0	28.8	Very Low
5-002.01	South Fork Pitt River	114,136.7	178.3	Low
5-002.02	Warm Springs Valley	68,007.9	106.3	Very Low
5-003	Jess Valley	6,705.4	10.5	Very Low
5-004	Big Valley	92,067.1	143.9	Medium
5-005	Fall River Valley	54,824.6	85.7	Low
5-006.01	Bowman			See Table A-2
5-006.02	Rosewood			See Table A-2
5-006.03	Anderson	98,704.6	154.2	Medium
5-006.04	Enterprise	61,288.3	95.8	Medium
5-006.05	Millville			See Table A-2
5-006.06	South Battle Creek			See Table A-2
5-007	Lake Almanor Valley	7,154.1	11.2	Very Low
5-008	Mountain Meadows Valley	8,145.9	12.7	Very Low
5-009	Indian Valley	29,413.2	46.0	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
5-010	American Valley	6,799.3	10.6	Very Low
5-011	Mohawk Valley	18,983.1	29.7	Very Low
5-012.01	Sierra Valley			See Table A-2
5-012.02	Chilcoot	7,545.7	11.8	Very Low
5-013	Upper Lake Valley	7,265.9	11.4	Very Low
5-014	Scotts Valley	7,326.1	11.4	Very Low
5-015	Big Valley	24,231.3	37.9	Medium
5-016	High Valley	2,357.9	3.7	Very Low
5-017	Burns Valley	2,875.1	4.5	Very Low
5-018	Coyote Valley	6,533.2	10.2	Very Low
5-019	Collayomi Valley	6,501.6	10.2	Very Low
5-020	Berryessa Valley	1,376.1	2.2	Very Low
5-021.50	Red Bluff	271,793.9	424.7	Medium
5-021.51	Corning			See Table A-2
5-021.52	Colusa			See Table A-2
5-021.53	Bend	22,676.4	35.4	Very Low
5-021.54	Antelope	19,090.8	29.8	High
5-021.55	Dye Creek			See Table A-2
5-021.56	Los Molinos			See Table A-2
5-021.57	Vina			See Table A-2
5-021.58	West Butte			See Table A-2
5-021.59	East Butte			See Table A-2
5-021.60	North Yuba			See Table A-2
5-021.61	South Yuba			See Table A-2
5-021.62	Sutter			See Table A-2
5-021.64	North American			See Table A-2
5-021.65	South American			See Table A-2
5-021.66	Solano			See Table A-2
5-021.67	Yolo			See Table A-2
5-021.69	Wyandotte Creek			See Table A-2
5-022.01	Eastern San Joaquin			See Table A-2
5-022.02	Modesto	245,252.7	383.2	High
5-022.03	Turlock	348,187.1	544.0	High
5-022.04	Merced	512,959.1	801.5	High
5-022.05	Chowchilla			See Table A-2
5-022.06	Madera			See Table A-2
5-022.07	Delta-Mendota			See Table A-2
5-022.08	Kings			See Table A-2
5-022.09	Westside	621,823.2	971.6	High
5-022.10	Pleasant Valley	48,195.6	75.3	Medium
5-022.11	Kaweah	441,003.9	689.1	High

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
5-022.12	Tulare Lake	535,869.1	837.3	High
5-022.13	Tule	477,646.4	746.3	High
5-022.14	Kern County			See Table A-2
5-022.15	Tracy			See Table A-2
5-022.16	Cosumnes			See Table A-2
5-022.17	Kettleman Plain	63,754.6	99.6	Low
5-022.18	White Wolf	107,546.3	168.0	Medium
5-023	Panoche Valley	33,086.6	51.7	Very Low
5-025	Kern River Valley	79,388.9	124.0	Very Low
5-026	Walker Basin Creek Valley	7,667.6	12.0	Very Low
5-027	Cummings Valley	10,019.3	15.7	Very Low
5-028	Tehachapi Valley West	14,803.1	23.1	Very Low
5-029	Castac Lake Valley	3,563.6	5.6	Very Low
5-030	Lower Lake Valley	2,405.8	3.8	Very Low
5-031	Long Valley	2,801.5	4.4	Very Low
5-035	Mccloud Area	21,334.5	33.3	Very Low
5-036	Round Valley	7,266.3	11.4	Very Low
5-037	Toad Well Area	3,357.5	5.2	Very Low
5-038	Pondosa Town Area	2,082.9	3.3	Very Low
5-040	Hot Springs Valley	2,405.1	3.8	Very Low
5-041	Egg Lake Valley	4,102.3	6.4	Very Low
5-043	Rock Prairie Valley	5,739.1	9.0	Very Low
5-044	Long Valley	1,087.0	1.7	Very Low
5-045	Cayton Valley	1,306.7	2.0	Very Low
5-046	Lake Britton Area	14,061.2	22.0	Very Low
5-047	Goose Valley	4,210.4	6.6	Very Low
5-048	Burney Creek Valley	2,352.9	3.7	Very Low
5-049	Dry Burney Creek Valley	3,076.0	4.8	Very Low
5-050	North Fork Battle Creek	12,761.9	19.9	Very Low
5-051	Butte Creek Valley	3,227.6	5.0	Very Low
5-052	Grays Valley	5,440.8	8.5	Very Low
5-053	Dixie Valley	4,867.0	7.6	Very Low
5-054	Ash Valley	6,007.1	9.4	Very Low
5-056	Yellow Creek Valley	2,311.7	3.6	Very Low
5-057	Last Chance Creek Valley	4,657.1	7.3	Very Low
5-058	Clover Valley	16,778.0	26.2	Very Low
5-059	Grizzly Valley	13,438.0	21.0	Very Low
5-060	Humbug Valley	9,976.2	15.6	Very Low
5-061	Chrome Town Area	1,409.2	2.2	Very Low
5-062	Elk Creek Area	1,439.4	2.2	Very Low
5-063	Stonyford Town Area	6,441.6	10.1	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
5-064	Bear Valley	9,110.8	14.2	Very Low
5-065	Little Indian Valley	1,269.5	2.0	Very Low
5-066	Clear Lake Cache Formation	29,740.4	46.5	Very Low
5-068	Pope Valley	7,182.5	11.2	Very Low
5-069	Yosemite Valley	7,454.9	11.6	Very Low
5-070	Los Banos Creek Valley	4,835.4	7.6	Very Low
5-071	Vallecitos Creek Valley	15,107.4	23.6	Very Low
5-080	Brite Valley	3,170.2	5.0	Very Low
5-082	Cuddy Canyon Valley	3,299.3	5.2	Very Low
5-083	Cuddy Ranch Area	4,202.6	6.6	Very Low
5-084	Cuddy Valley	3,465.3	5.4	Very Low
5-085	Mil Potrero Area	2,308.9	3.6	Very Low
5-086	Joseph Creek	4,456.4	7.0	Very Low
5-087	Middle Fork Feather River	4,341.3	6.8	Very Low
5-088	Stony Gorge Reservoir	1,065.6	1.7	Very Low
5-089	Squaw Flat	1,294.4	2.0	Very Low
5-090	Funks Creek	3,014.1	4.7	Very Low
5-091	Antelope Creek	2,040.9	3.2	Very Low
5-092	Blanchard Valley	2,222.9	3.5	Very Low
5-094	Middle Creek	705.2	1.1	Very Low
5-095	Meadow Valley	5,734.9	9.0	Very Low
6-001	Surprise Valley	228,661.5	357.3	Very Low
6-002	Madeline Plains	156,097.3	243.9	Very Low
6-003	Willow Creek Valley	11,695.9	18.3	Very Low
6-004	Honey Lake Valley	311,716.0	487.1	Low
6-005.01	Tahoe South	14,800.3	23.1	Medium
6-005.02	Tahoe West	6,168.4	9.6	Very Low
6-005.03	Tahoe North	1,929.7	3.0	Very Low
6-006	Carson Valley	10,721.5	16.8	Very Low
6-007	Antelope Valley	20,078.1	31.4	Very Low
6-008	Bridgeport Valley	32,485.6	50.8	Very Low
6-009	Mono Valley	172,843.2	270.1	Very Low
6-010	Adobe Lake Valley	39,866.2	62.3	Very Low
6-011	Long Valley	71,843.8	112.3	Very Low
6-012.01	Owens Valley			See Table A-2
6-012.02	Fish Slough	3,221.6	5.0	Very Low
6-013	Black Springs Valley	30,766.9	48.1	Very Low
6-014	Fish Lake Valley	48,003.9	75.0	Low
6-015	Deep Springs Valley	29,930.4	46.8	Very Low
6-016	Eureka Valley	128,759.7	201.2	Very Low
6-017	Saline Valley	146,182.8	228.4	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
6-018	Death Valley	920,379.9	1,438.1	Very Low
6-019	Wingate Valley	71,285.4	111.4	Very Low
6-020	Middle Amargosa Valley	389,763.4	609.0	Very Low
6-021	Lower Kingston Valley	239,740.3	374.6	Very Low
6-022	Upper Kingston Valley	176,749.2	276.2	Very Low
6-023	Riggs Valley	87,515.1	136.7	Very Low
6-024	Red Pass Valley	96,315.4	150.5	Very Low
6-025	Bicycle Valley	89,458.5	139.8	Very Low
6-026	Avawatz Valley	27,612.1	43.1	Very Low
6-027	Leach Valley	61,175.5	95.6	Very Low
6-028	Pahrump Valley	92,926.7	145.2	Very Low
6-029	Mesquite Valley	88,157.1	137.7	Very Low
6-030	Ivanpah Valley	198,129.1	309.6	Very Low
6-031	Kelso Valley	254,686.6	397.9	Very Low
6-032	Broadwell Valley	91,878.2	143.6	Very Low
6-033	Soda Lake Valley	380,056.3	593.8	Very Low
6-034	Silver Lake Valley	35,202.1	55.0	Very Low
6-035	Cronise Valley	126,299.9	197.3	Very Low
6-036.01	Langford Well Lake	19,312.1	30.2	Very Low
6-036.02	Irwin	10,480.3	16.4	Very Low
6-037	Coyote Lake Valley	88,101.8	137.7	Very Low
6-038	Caves Canyon Valley	72,962.3	114.0	Very Low
6-040	Lower Mojave River Valley	285,485.5	446.1	Very Low
6-041	Middle Mojave River Valley	211,320.7	330.2	Very Low
6-042	Upper Mojave River Valley	412,841.0	645.1	Very Low
6-043	El Mirage Valley	75,896.1	118.6	Very Low
6-044	Antelope Valley	1,010,268.8	1,578.5	Very Low
6-045	Tehachapi Valley East	23,967.3	37.4	Very Low
6-046	Fremont Valley	335,234.1	523.8	Low
6-047	Harper Valley	409,501.8	639.8	Very Low
6-048	Goldstone Valley	28,090.5	43.9	Very Low
6-049	Superior Valley	120,319.7	188.0	Very Low
6-050	Cuddeback Valley	94,901.9	148.3	Very Low
6-051	Pilot Knob Valley	138,605.1	216.6	Very Low
6-052	Searles Valley	197,011.4	307.8	Very Low
6-053	Salt Wells Valley	29,473.9	46.1	Very Low
6-054	Indian Wells Valley	381,708.6	596.4	High
6-055	Coso Valley	25,561.6	39.9	Very Low
6-056	Rose Valley	42,524.8	66.4	Very Low
6-057	Darwin Valley	44,160.9	69.0	Very Low
6-058	Panamint Valley	259,290.7	405.1	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
6-061	Cameo Area	9,303.4	14.5	Very Low
6-062	Race Track Valley	14,113.3	22.1	Very Low
6-063	Hidden Valley	17,943.3	28.0	Very Low
6-064	Marble Canyon Area	10,363.5	16.2	Very Low
6-065	Cottonwood Spring Area	3,896.7	6.1	Very Low
6-066	Lee Flat	20,282.8	31.7	Very Low
6-067	Martis Valley	36,357.0	56.8	Very Low
6-068	Santa Rosa Flat	16,779.9	26.2	Very Low
6-069	Kelso Lander Valley	11,164.7	17.4	Very Low
6-070	Cactus Flat	7,025.1	11.0	Very Low
6-071	Lost Lake Valley	23,253.6	36.3	Very Low
6-072	Coles Flat	2,946.0	4.6	Very Low
6-073	Wild Horse Mesa Area	3,320.5	5.2	Very Low
6-074	Harrisburg Flats	24,928.3	39.0	Very Low
6-075	Wildrose Canyon	5,151.3	8.0	Very Low
6-076	Brown Mountain Valley	21,726.6	33.9	Very Low
6-077	Grass Valley	9,974.8	15.6	Very Low
6-078	Denning Spring Valley	7,231.6	11.3	Very Low
6-079	California Valley	58,111.7	90.8	Very Low
6-080	Middle Park Canyon	1,741.4	2.7	Very Low
6-081	Butte Valley	8,797.6	13.7	Very Low
6-082	Spring Canyon Valley	4,800.4	7.5	Very Low
6-084	Greenwater Valley	59,813.8	93.5	Very Low
6-085	Gold Valley	3,210.7	5.0	Very Low
6-086	Rhodes Hill Area	15,578.5	24.3	Very Low
6-088	Owl Lake Valley	22,242.3	34.8	Very Low
6-089	Kane Wash Area	5,954.1	9.3	Very Low
6-090	Cady Fault Area	7,949.2	12.4	Very Low
6-091	Cow Head Lake Valley	5,617.4	8.8	Very Low
6-092	Pine Creek Valley	9,526.9	14.9	Very Low
6-093	Harvey Valley	4,503.2	7.0	Very Low
6-094	Grasshopper Valley	17,663.8	27.6	Very Low
6-095	Dry Valley	6,497.5	10.2	Very Low
6-096	Eagle Lake Area	12,699.5	19.8	Very Low
6-097	Horse Lake Valley	3,826.3	6.0	Very Low
6-098	Tuledad Canyon Valley	5,149.9	8.0	Very Low
6-099	Painters Flat	6,374.2	10.0	Very Low
6-100	Secret Valley	33,663.7	52.6	Very Low
6-101	Bull Flat	18,117.1	28.3	Very Low
6-104	Long Valley	46,846.2	73.2	Very Low
6-105	Slinkard Valley	4,511.2	7.0	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
6-106	Little Antelope Valley	2,487.7	3.9	Very Low
6-107	Sweetwater Flat	4,719.8	7.4	Very Low
6-108	Olympic Valley	702.0	1.1	Very Low
7-001	Lanfair Valley	156,540.3	244.6	Very Low
7-002	Fenner Valley	452,482.5	707.0	Very Low
7-003	Ward Valley	557,586.4	871.2	Very Low
7-004	Rice Valley	188,094.1	293.9	Very Low
7-005	Chuckwalla Valley	601,573.1	940.0	Very Low
7-006	Pinto Valley	182,439.4	285.1	Very Low
7-007	Cadiz Valley	269,847.9	421.6	Very Low
7-008	Bristol Valley	496,816.2	776.3	Very Low
7-009	Dale Valley	212,533.3	332.1	Very Low
7-010	Twentynine Palms Valley	62,260.0	97.3	Very Low
7-011	Copper Mountain Valley	30,279.7	47.3	Very Low
7-012	Warren Valley			See Table A-2
7-013.01	Deadman Lake	89,012.4	139.1	Very Low
7-013.02	Surprise Spring	29,253.2	45.7	Very Low
7-014	Lavic Valley	102,278.3	159.8	Very Low
7-015	Bessemer Valley	39,067.7	61.0	Very Low
7-016	Ames Valley	108,438.1	169.4	Very Low
7-017	Means Valley	14,941.5	23.3	Very Low
7-018.01	Soggy Lake	77,277.4	120.7	Very Low
7-018.02	Upper Johnson Valley	34,782.1	54.3	Very Low
7-019	Lucerne Valley	147,431.5	230.4	Very Low
7-020	Morongo Valley	7,228.1	11.3	Very Low
7-021.01	Indio	297,156.4	464.3	Medium
7-021.02	Mission Creek	48,571.7	75.9	Medium
7-021.03	Desert Hot Springs	100,947.6	157.7	Very Low
7-021.04	San Gorgonio Pass	38,545.1	60.2	Medium
7-022	West Salton Sea	105,382.3	164.7	Very Low
7-024.01	Borrego Springs	62,749.2	98.0	High
7-024.02	Ocotillo Wells	90,086.8	140.8	Very Low
7-025	Ocotillo-Clark Valley	222,280.2	347.3	Very Low
7-026	Terwilliger Valley	8,017.4	12.5	Very Low
7-027	San Felipe Valley	23,376.4	36.5	Very Low
7-028	Vallecito-Carrizo Valley	121,816.0	190.3	Very Low
7-029	Coyote Wells Valley	145,659.9	227.6	Very Low
7-030	Imperial Valley	957,774.4	1,496.5	Very Low
7-031	Orocopia Valley	96,223.5	150.3	Very Low
7-032	Chocolate Valley	129,107.2	201.7	Very Low
7-033	East Salton Sea	194,844.2	304.4	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
7-034	Amos Valley	129,920.8	203.0	Very Low
7-035	Ogilby Valley	133,170.1	208.1	Very Low
7-036	Yuma Valley	123,880.6	193.6	Very Low
7-037	Arroyo Seco Valley	256,477.9	400.7	Very Low
7-038	Palo Verde Valley	72,934.1	114.0	Very Low
7-039	Palo Verde Mesa	224,910.8	351.4	Very Low
7-040	Quien Sabe Point Valley	25,173.3	39.3	Very Low
7-041	Calzona Valley	80,545.6	125.9	Very Low
7-042	Vidal Valley	137,660.1	215.1	Very Low
7-043	Chemehuevi Valley	272,014.5	425.0	Very Low
7-044	Needles Valley	88,053.9	137.6	Very Low
7-045	Piute Valley	175,192.4	273.7	Very Low
7-046	Canebrake Valley	5,411.5	8.5	Very Low
7-047	Jacumba Valley	2,475.7	3.9	Very Low
7-048	Helendale Fault Valley	2,617.2	4.1	Very Low
7-049	Pipes Canyon Fault Valley	3,382.0	5.3	Very Low
7-050	Iron Ridge Area	5,243.0	8.2	Very Low
7-051	Lost Horse Valley	17,299.6	27.0	Very Low
7-052	Pleasant Valley	9,642.6	15.1	Very Low
7-053	Hexie Mountain Area	11,131.9	17.4	Very Low
7-054	Buck Ridge Fault Valley	6,914.5	10.8	Very Low
7-055	Collins Valley	7,062.2	11.0	Very Low
7-056	Yaqui Well Area	14,966.6	23.4	Very Low
7-059	Mason Valley	5,520.5	8.6	Very Low
7-061	Davies Valley	3,570.9	5.6	Very Low
7-062	Joshua Tree			See Table A-2
7-063	Vandeventer Flat	6,732.0	10.5	Very Low
8-001	Coastal Plain Of Orange County	224,226.3	350.4	Medium
8-002.01	Chino	153,762.3	240.3	Very Low
8-002.02	Cucamonga	9,028.0	14.1	Very Low
8-002.03	Riverside-Arlington	56,563.1	88.4	Very Low
8-002.04	Rialto-Colton	24,794.1	38.7	Very Low
8-002.05	Cajon	23,134.6	36.1	Very Low
8-002.06	San Bernardino	92,488.2	144.5	Very Low
8-002.07	Yucaipa	22,218.8	34.7	High
8-002.08	San Timoteo			See Table A-2
8-002.09	Temescal	22,963.6	35.9	Medium
8-004.01	Elsinore Valley	23,601.2	36.9	Medium
8-004.02	Bedford-Coldwater	7,025.7	11.0	Very Low
8-005	San Jacinto			See Table A-2
8-006	Hemet Lake Valley	16,679.9	26.1	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
8-007	Big Meadows Valley	14,162.1	22.1	Very Low
8-008	Seven Oaks Valley	4,075.2	6.4	Very Low
8-009	Bear Valley	19,170.1	30.0	Very Low
9-001	San Juan Valley	16,712.4	26.1	Very Low
9-002	San Mateo Valley	2,993.5	4.7	Very Low
9-003	San Onofre Valley	1,238.1	1.9	Very Low
9-004	Santa Margarita Valley	5,214.7	8.1	Very Low
9-005	Temecula Valley	87,752.6	137.1	Very Low
9-006	Cahuilla Valley	18,201.6	28.4	Very Low
9-007	San Luis Rey Valley			See Table A-2
9-008	Warner Valley	23,963.5	37.4	Very Low
9-009	Escondido Valley	2,886.9	4.5	Very Low
9-010	San Pasqual Valley	3,498.4	5.5	Medium
9-011	Santa Maria Valley	12,289.9	19.2	Very Low
9-012	San Dieguito Creek	3,547.9	5.5	Very Low
9-013	Poway Valley	2,467.9	3.9	Very Low
9-014	Mission Valley	7,302.5	11.4	Very Low
9-015	San Diego River Valley			See Table A-2
9-016	El Cajon Valley	7,152.1	11.2	Very Low
9-022	Batiquitos Lagoon Valley	740.8	1.2	Very Low
9-023	San Elijo Valley	882.3	1.4	Very Low
9-024	Pamo Valley	1,502.5	2.3	Very Low
9-025	Ranchita Town Area	3,119.9	4.9	Very Low
9-027	Cottonwood Valley	3,838.5	6.0	Very Low
9-028	Campo Valley	3,538.5	5.5	Very Low
9-029	Potrero Valley	2,018.9	3.2	Very Low
9-032	San Marcos Area	2,129.8	3.3	Very Low
9-033	Coastal Plain of San Diego			See Table A-2

Figure A-2 Statewide Map of SGMA 2019 Basin Prioritization Results, Phase 2 Draft

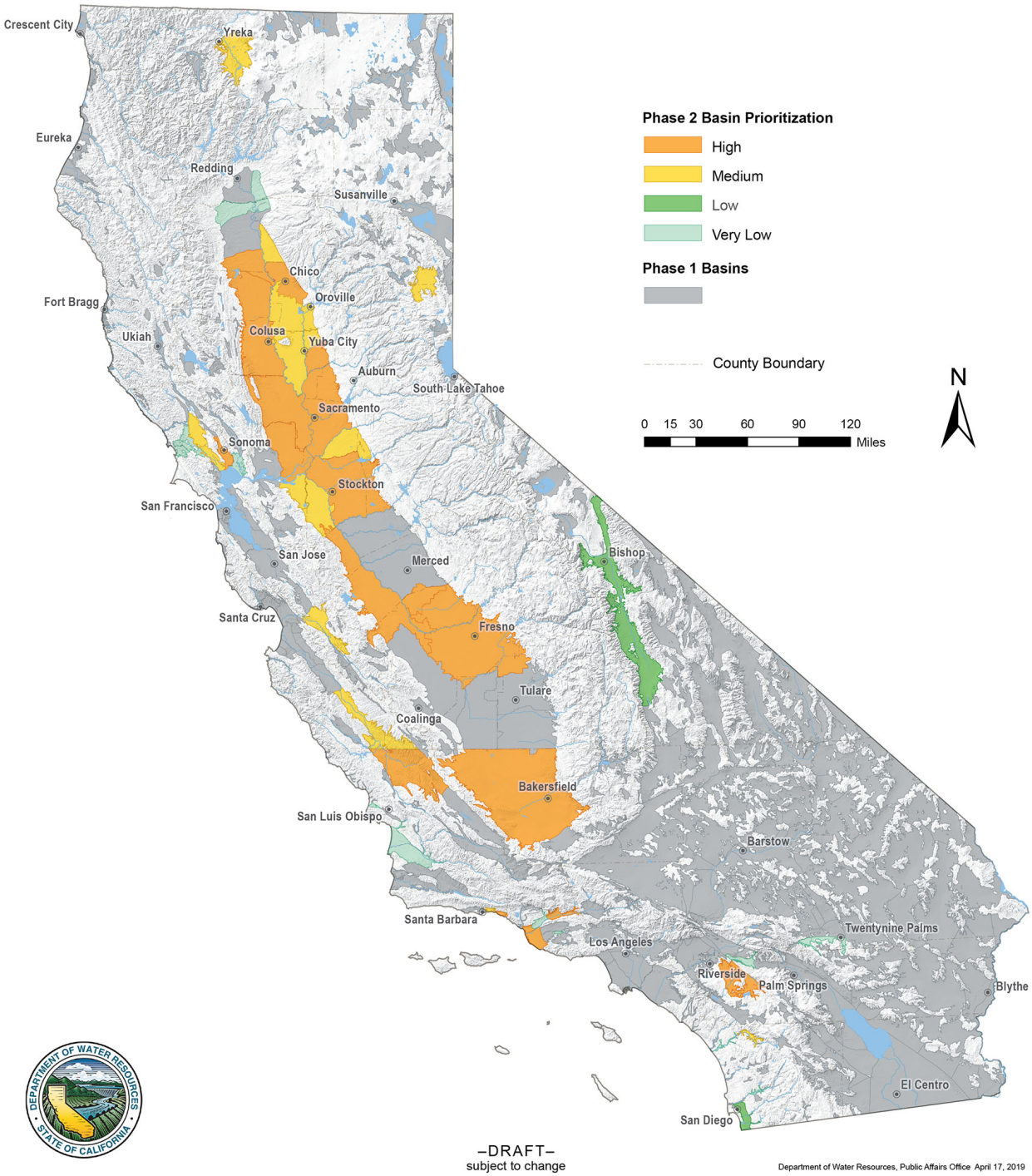

Table A-2 Statewide SGMA 2019 Basin Prioritization Results, Phase 2 Draft

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
1-004	Shasta Valley	218,215.03	340.96	Medium
1-055.01	Santa Rosa Plain	81,284.31	127.01	Medium
1-059	Wilson Grove Formation Highlands	63,836.66	99.74	Very Low
2-001	Petaluma Valley	46,661.32	72.91	Medium
2-002.02	Sonoma Valley	44,846.18	70.07	High
2-002.03	Napa-Sonoma Lowlands	40,297.45	62.96	Very Low
2-027	Sand Point Area	22,342.21	34.91	Very Low
~~3-003.02~~	~~Bolsa Area~~	Basin consolidated into 3-003.05		
~~3-003.03~~	~~Hollister Area~~	Basin consolidated into 3-003.05		
~~3-003.04~~	~~San Juan Bautista Area~~	Basin consolidated into 3-003.05		
3-003.05	North San Benito	131,030.03	204.73	Medium
3-004.05	Upper Valley Aquifer	238,020.54	371.91	Medium
3-004.06	Paso Robles Area	436,157.09	681.50	High
~~3-008~~	~~Los Osos Valley~~	Basin split in 3-008.01 and 3-008.02		
3-008.01	Los Osos	4,232.03	6.61	Very Low
3-008.02	Warden Creek	1,762.94	2.75	Very Low
~~3-012~~	~~Santa Maria River Valley~~	Basin split into 3-012.01 and 3-012.02		
3-012.01	Santa Maria	170,212.68	265.96	Very Low
3-012.02	Arroyo Grande	2,901.22	4.53	Very Low
3-018	Carpinteria	7,977.71	12.47	High
~~3-025~~	~~Tres Pinos Valley~~	Basin consolidated into 3-003.05		
3-049	Montecito	6,144.71	9.60	Medium
4-004.02	Oxnard	57,887.91	90.45	High
4-004.03	Mound	13,865.83	21.67	High
4-004.04	Santa Paula	22,112.00	34.55	Very Low
4-004.05	Fillmore	22,585.84	35.29	High
4-004.06	Piru	10,896.87	17.03	High
4-007	Arroyo Santa Rosa Valley	3,924.27	6.13	Very Low
5-006.01	Bowman	122,533.80	191.46	Very Low
~~5-006.02~~	~~Rosewood~~	Basin consolidated into 5-006.01		
5-006.05	Millville	65,616.02	102.53	Very Low
5-006.06	South Battle Creek	33,716.35	52.68	Very Low
5-012.01	Sierra Valley	117,292.42	183.27	Medium
5-021.51	Corning	207,342.76	323.97	High
5-021.52	Colusa	723,823.74	1,130.97	High
~~5-021.55~~	~~Dye Creek~~	Basin consolidated into 5-021.56		
5-021.56	Los Molinos	99,422.40	155.35	Medium
5-021.57	Vina	184,917.61	288.93	High
~~5-021.58~~	~~West Butte~~	Basin consolidated into 5-021.70		

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
~~5-021.59~~	~~East Butte~~	Basin consolidated into 5-021.70		
5-021.60	North Yuba	60,838.08	95.06	Medium
5-021.61	South Yuba	109,020.31	170.34	High
5-021.62	Sutter	285,809.87	446.58	Medium
5-021.64	North American	342,241.43	534.75	High
5-021.65	South American	248,403.37	388.13	High
5-021.66	Solano	354,672.90	554.18	High
5-021.67	Yolo	540,693.50	844.83	High
5-021.69	Wyandotte Creek	59,382.18	92.78	Medium
5-021.70	Butte	265,500.00	414.84	Medium
5-022.01	Eastern San Joaquin	764,802.78	1,195.00	High
5-022.05	Chowchilla	145,574.30	227.46	High
5-022.06	Madera	347,667.39	543.23	High
5-022.07	Delta-Mendota	764,964.86	1,195.26	High
5-022.08	Kings	981,324.82	1,533.32	High
5-022.14	Kern County	1,782,320.81	2,784.88	High
5-022.15	Tracy	238,428.97	372.55	Medium
5-022.16	Cosumnes	210,275.92	328.56	Medium
5-022.19	East Contra Costa	107,596.40	168.12	Medium
6-012.01	Owens Valley	660,648.16	1,032.26	Low
7-012	Warren Valley	17,475.73	27.31	Very Low
7-062	Joshua Tree	33,448.78	52.26	Very Low
8-002.08	San Timoteo	32,287.65	50.45	Very Low
8-005	San Jacinto	158,534.44	247.71	High
~~9-007~~	~~San Luis Rey Valley~~	Basin split into 9-007.01 and 9-007.02		
9-007.01	Upper San Luis Rey Valley	19,254.35	30.08	Medium
9-007.02	Lower San Luis Rey Valley	10,411.92	16.27	Very Low
9-015	San Diego River Valley	9,873.37	15.43	Very Low
9-033	Coastal Plain of San Diego	54,980.89	85.91	Low

Appendix 2 – DWR standard land use legend (adapted for remote sensing crop mapping) (component 6.a)

Crop Category	DWR 20 Crop (CalSIMETAW Input)	Crop
G – GRAIN & HAY	Miscellaneous Grain and Hay	Wheat, Miscellaneous grain and hay
R – RICE	Rice	Rice, Wild rice
F – FIELD CROPS	Cotton	Cotton
	Safflower	Safflower
	Other Field	Sunflowers
	Dry Beans	Beans (dry)
	Corn	Corn (field & sweet), sorghum and Sudan
P - PASTURE	Alfalfa	Alfalfa & alfalfa mixtures
	Pasture	Mixed pasture Miscellaneous grasses (includes Bermuda grass, ryegrass, turf grass, etc.)
T – TRUCK, NURSERY, AND BERRY CROPS	Onions & Garlic	Onions and garlic
	Tomato Processing	Tomatoes (processing and fresh)
	Potatoes	Potatoes and sweet potatoes
	Cucurbits	Melons, squash, and cucumbers (all types)
	Truck Crops	Cole crops (includes broccoli, cauliflower, cabbage, brussel sprouts, mixed cole crops or cole crops not specifically listed in the legend) Carrots Lettuce/leafy greens Flowers, nursery & Christmas tree farms Bush berries (includes blueberries, blackberries, raspberries, and other bush berries) Strawberries Peppers (chili, bell, etc.) Miscellaneous truck (a truck crop not specifically listed in the legend)
D – DECIDUOUS FRUITS AND NUTS	Almonds & Pistachios	Almonds, Pistachios
	Other Deciduous	Apples Cherries Peaches/nectarines Pears Plums, prunes, and apricots Walnuts Pomegranates Miscellaneous deciduous (a type of deciduous orchard not specifically listed in the legend) Young perennial fruits and nuts (includes young orchards and vineyards)
C – CITRUS AND SUBTROPICAL	Citrus Subtropical	Citrus Dates Avocados Olives Kiwis Miscellaneous subtropical fruits
V – VINEYARDS	Vineyard	Grapes

Note: Crop categories not in included in DWR 20 Crop categories are Sugar Beets (none reported in the state during 2014) and Fresh tomatoes (combined with Tomato Processing). Non-crop categories, Urban, Native Riparian, Idle and Water Surface, are not used in basin prioritization.

Appendix 3 – List of chemicals used in the evaluation of documented water quality degradation (component 7.d)

GAMA Storenum	Units	MCL	Chemical Name	GAMA Storenum	Units	MCL	Chemical Name
Primary MCL							
TCA111	UG/L	200	1,1,1-Trichloroethane	ENDOTHAL	UG/L	100	Endothal
PCA	UG/L	1	1,1,2,2-Tetrachloroethane	ENDRIN	UG/L	2	Endrin
FC113	MG/L	1.2	1,1,2-Trichloro-1,2,2-Trifluoroethane	EBZ	UG/L	300	Ethylbenzene
TCA112	UG/L	5	1,1,2-Trichloroethane	F	MG/L	2	Fluoride (F)
DCA11	UG/L	5	1,1-Dichloroethane	ALPHA	pCi/L	15	Gross Alpha
DCE11	UG/L	6	1,1-Dichloroethylene	HEPTACHLOR	UG/L	0.01	Heptachlor
TCB124	UG/L	5	1,2,4-Trichlorobenzene	HCLBZ	UG/L	1	Hexachlorobenzene
DCBZ12	UG/L	600	1,2-Dichlorobenzene	HCCP	UG/L	50	Hexachlorocyclopentadiene
DCA12	UG/L	0.5	1,2-Dichloroethane	PB	UG/L	15	Lead
DCPA12	UG/L	5	1,2-Dichloropropane	BHCGAMMA	UG/L	0.2	Lindane
DCP13	UG/L	0.5	1,3-Dichloropropene (Total)	HG	UG/L	2	Mercury
DCBZ14	UG/L	5	1,4-Dichlorobenzene	MTXYCL	UG/L	30	Methoxychlor
SILVEX	UG/L	50	2,4,5-Tp (Silvex)	MTBE	UG/L	13	Methyl-Tert-Butyl-Ether (Mtbe)
24D	UG/L	70	2,4-D	MOLINATE	UG/L	20	Molinate
ALACL	UG/L	2	Alachlor	NI	UG/L	100	Nickel
AL	UG/L	1000	Aluminum	NO3N	MG/L	10	Nitrate (As N)
SB	UG/L	6	Antimony	OXAMYL	UG/L	50	Oxamyl
AS	UG/L	10	Arsenic	PCP	UG/L	1	Pentachlorophenol
ATRAZINE	UG/L	1	Atrazine	PCATE	UG/L	6	Perchlorate
BA	MG/L	1	Barium	PICLORAM	MG/L	0.5	Picloram
BTZ	UG/L	18	Bentazon	PCB1016	UG/L	0.5	Polychlorinated Biphenyls
BZ	UG/L	1	Benzene	SE	UG/L	50	Selenium
BZAP	UG/L	0.2	Benzo (A) Pyrene	SIMAZINE	UG/L	4	Simazine
BE	UG/L	4	Beryllium	SR-90	pCi/L	8	Strontium-90
BRO3	UG/L	10	Bromate	STY	UG/L	100	Styrene
CD	UG/L	5	Cadmium	PCE	UG/L	5	Tetrachloroethylene
CTCL	UG/L	0.5	Carbon Tetrachloride	TL	UG/L	2	Thallium
CHLORITE	MG/L	1	Chlorite	THIOBENCARB	UG/L	70	Thiobencarb
CLBZ	UG/L	70	Chlorobenzene (Monochlorobenzene)	BZME	UG/L	150	Toluene
CR	UG/L	50	Chromium (Total)	THM	UG/L	80	Total Trihalomethanes

GAMA Storenum	Units	MCL	Chemical Name	GAMA Storenum	Units	MCL	Chemical Name
DCE12C	UG/L	6	Cis-1,2-Dichloroethylene	DCE12T	UG/L	10	Trans-1,2-Dichloroethylene
CN	UG/L	150	Cyanide	TCE	UG/L	5	Trichloroethylene
DALAPON	UG/L	200	Dalapon	FC11	UG/L	150	Trichlorofluoromethane
DOA	MG/L	0.4	Di(2-Ethylhexyl)Adipate	H-3	pCi/L	20000	Tritium
BIS2EHP	UG/L	4	Di(2-Ethylhexyl)Phthalate	U	pCi/L	20	Uranium
DCMA	UG/L	5	Dichloromethane	VC	UG/L	0.5	Vinyl Chloride
DINOSEB	UG/L	7	Dinoseb	XYLENES	UG/L	1750	Xylenes (Total)
Secondary MCL							
CU	MG/L	1	Copper	ZN	MG/L	5	Zinc
FOAMAGENTS	MG/L	0.5	Foaming Agents (Mbas)	CL	MG/L	500	Chloride
FE	UG/L	300	Iron	SO4	MG/L	500	Sulfate
MN	UG/L	50	Manganese	TDS	MG/L	1000	Total Dissolved Solids
AG	UG/L	100	Silver				

Source: State Water Resources Control Board 2017

Key: GAMA = groundwater ambient monitoring and assessment; MCL = maximum contaminant level; UG/L = microgram per liter; MG/L = milligram per liter; pCi/L = picocuries per liter

Note: The water quality data query of the SWRCB GAMA database and the initial basin prioritization water quality analysis was performed on and soon after April 4, 2017. Hexavalent chromium (CR6) was included on the above list as a Primary MCL and used in the initial analysis. In September 2017, CR6 was removed from the MCL Primary list on court order. The water quality analysis for basin prioritization was corrected to reflect this change and consequently does not include any CR6 records.

Appendix 4 – Computed groundwater volume for non-adjudicated portion(s) of basins with adjudicated area used during evaluation (component 8.c.3)

Basin Number	Basin/Subbasin Name	Groundwater volume (acre-feet) of non-adjudicated portion of basin[1]
1-005	Scott River Valley	27,496
3-004.08	Salinas Valley/Seaside	0
3-008.01	Los Osos Valley/ Los Osos Area	2
3-012.01	Santa Maria/ Santa Maria	2,316
3-016	Goleta	557
4-004.04	Santa Clara River Valley/ Santa Paula	668
4-011.03	Coastal Plain of Los Angeles/ West Coast	60
4-011.04	Coastal Plain of Los Angeles/ Central	0
4-012	San Fernando Valley	1,025
4-013	San Gabriel Valley	7,000
4-023	Raymond	1
5-027	Cummings Valley	63
5-028	Tehachapi Valley West	222
5-080	Brite Valley	8
6-012.01	Owens Valley/Owens Valley	24,346
6-037	Coyote Lake Valley	1
6-038	Caves Canyon Valley	2
6-040	Lower Mojave River Valley	0
6-041	Middle Mojave River Valley	0
6-042	Upper Mojave River Valley	5
6-043	El Mirage Valley	526
6-044	Antelope Valley	2,631
6-045	Tehachapi Valley East	55
6-047	Harper Valley	7
6-089	Kane Wash Area	0
7-012	Warren Valley	69
7-019	Lucerne Valley	0
8-002.01	Upper Santa Ana Valley/ Chino	2,553
8-002.02	Upper Santa Ana Valley/ Cucamonga	1
8-002.03	Upper Santa Ana Valley/ Riverside-Arlington	7,778
8-002.04	Upper Santa Ana Valley/ Rialto-Colton	2,349
8-002.06	Upper Santa Ana Valley/ Bunker Hill	216
8-002.08	Upper Santa Ana Valley/ San Timoteo	3,806
8-005	San Jacinto	32,508
9-004	Santa Margarita Valley	0
9-005	Temecula Valley	29
9-006	Cahuilla Valley	10

Note:

1 From Step 4 of Component # 8.c.3

Appendix 5 – Breakdown of area in basins with adjudications used during evaluation (component 8.c.3)

Basin	Basin /Subbasin Name	Basin Area (Acres)	Adjudicated Acres	Percent Adjudicated	Non-Adjudicated Acres	Percent Non-Adjudicated
1-005	Scott River Valley	63,831	10,015	15.69%	53,816	84.31%
3-004.08	Salinas Valley/Seaside	14,489	14,489	100.00%	0	0.00%
3-008.01	Los Osos Valley/ Los Osos Area	4,232	4,226	99.87%	6	0.13%
3-012.01	Santa Maria/ Santa Maria	170,213	162,277	95.34%	7,936	4.66%
3-016	Goleta	9,217	8,034	87.16%	1,183	12.84%
4-004.04	Santa Clara River Valley/ Santa Paula	22,112	20,646	93.37%	1,466	6.63%
4-011.03	Coastal Plain of Los Angeles/ West Coast	92,997	92,532	99.50%	465	0.50%
4-011.04	Coastal Plain of Los Angeles/ Central	177,770	149,067	83.85%	28,703	16.15%
4-012	San Fernando Valley	144,837	143,363	98.98%	1,474	1.02%
4-013	San Gabriel Valley	126,379	122,603	97.01%	3,776	2.99%
4-023	Raymond	26,049	26,047	99.99%	2	0.01%
5-027	Cummings Valley	10,019	9,213	91.95%	807	8.05%
5-028	Tehachapi Valley West	14,803	13,085	88.40%	1,718	11.60%
5-080	Brite Valley	3,170	2,845	89.73%	326	10.27%
6-012.01	Owens Valley/ Owens Valley	660,648	231,276	35.01%	429,372	64.99%
6-037	Coyote Lake Valley	88,102	80,890	91.81%	7,212	8.19%
6-038	Caves Canyon Valley	72,962	27,201	37.28%	45,761	62.72%
6-040	Lower Mojave River Valley	285,486	260,561	91.27%	24,925	8.73%
6-041	Middle Mojave River Valley	211,321	206,613	97.77%	4,707	2.23%
6-042	Upper Mojave River Valley	412,841	405,091	98.12%	7,750	1.88%
6-043	El Mirage Valley	75,896	70,298	92.62%	5,598	7.38%
6-044	Antelope Valley	1,010,269	904,447	89.53%	105,822	10.47%
6-045	Tehachapi Valley East	23,967	11,658	48.64%	12,310	51.36%
6-047	Harper Valley	409,502	351,094	85.74%	58,408	14.26%
6-089	Kane Wash Area	5,954	5,954	100.00%	0	0.00%
7-012	Warren Valley	17,476	13,035	74.59%	4,441	25.41%
7-019	Lucerne Valley	147,432	145,964	99.00%	1,468	1.00%
8-002.01	Upper Santa Ana Valley/ Chino	153,762	146,652	95.38%	7,110	4.62%
8-002.02	Upper Santa Ana Valley/ Cucamonga	9,028	8,232	91.18%	796	8.82%
8-002.03	Upper Santa Ana Valley/ Riverside-Arlington	56,563	37,217	65.80%	19,346	34.20%
8-002.04	Upper Santa Ana Valley/ Rialto-Colton	24,794	23,636	95.33%	1,158	4.67%
8-002.06	Upper Santa Ana Valley/ San Bernardino	92,488	87,594	94.71%	4,894	5.29%
8-002.08	Upper Santa Ana Valley/ San Timoteo	32,288	14,138	43.79%	18,150	56.21%
8-005	San Jacinto	158,534	59,939	37.81%	98,596	62.19%
9-004	Santa Margarita Valley	5,215	5,191	99.54%	24	0.46%
9-005	Temecula Valley	87,753	87,386	99.58%	367	0.42%
9-006	Cahuilla Valley	18,202	17,850	98.07%	351	1.93%

Appendix 6 – Groundwater Basins Identified with Groundwater-Related Transfers (component 8.d.2)

Groundwater Basin ID	Groundwater Basin / Subbasin Name	Type of Groundwater-Related Transfer	Year	Total Groundwater Pumped (AF)
4-003.01	Ventura River Valley / Upper Ventura River	B	2015	1,314
5-006.03	Redding Area / Anderson	A	2013	2,314
			2014	3,526
			2015	3,785
5-021.51	Sacramento Valley / Corning	A	2013	2,030
5-021.52	Sacramento Valley / Colusa	A	2009	1,447
			2013	2,970
			2014	6,838
			2015	13,969
5-021.60	Sacramento Valley / North Yuba	A	2009	8,262
			2013	8,270
			2014	2,102
			2018	9,080
5-021.61	Sacramento Valley / South Yuba	A	2014	3,637
			2015	2,000
			2018	5,998
5-021.62	Sacramento Valley / Sutter	A	2009	14,841
			2010	14,317
			2013	15,264
			2014	17,400
			2015	8,659
			2018	15,352
5-021.64	Sacramento Valley / North American	A	2009	24,630
			2010	13,045
			2013	8,903
			2014	27,334
			2015	28,358
			2018	21,551
5-021.66	Sacramento Valley/Solano	A	2011	409
5-021.67	Sacramento Valley / Yolo	A	2009	4,873
			2013	7,155
			2014	16,995
			2015	14,668
			2018	1,149
5-021.70	Sacramento Valley / Butte	A	2009	5,501
			2013	7,175