

Executive Summary

1 Introduction

- 1.1 Purpose of Groundwater Sustainability Plan
- 1.2 Sustainability Goal
- 1.3 Coordination Agreements
- 1.4 Inter-basin Agreements
- 1.5 Agency Information

Legal Requirements:

§354.6(a) The name and mailing address of the Agency

- 1.5.1 Organization and management structure of the GSA

Legal Requirements:

§354.6(b) The organization and management structure of the Agency, identifying persons with management authority for implementation of the Plan.

§354.6(c) The name and contact information, including the phone number, mailing address and electronic mail address, of the plan manager.

- 1.5.2 Legal authority of the GSA

Legal Requirements:

§354.6(d) The legal authority of the Agency, with specific reference to citations setting forth the duties, powers, and responsibilities of the Agency, demonstrating that the Agency has the legal authority to implement the plan.

§354.6(e) An estimate of the cost of implementing the Plan and a general description of how the Agency plans to meet those costs.

- 1.6 GSP Organization and Preparation Checklist

2 Plan Area

Legal Requirements:

§354.8 Each Plan shall include a description of the geographic areas covered, including the following information:

- (a) One or more maps of the basin that depict the following, as applicable:
 - 1) The area covered by the Plan, delineating areas managed by the Agency as an exclusive Agency and any areas for which the Agency is not an exclusive Agency, and the name and location of any adjacent basins.
 - 2) Adjudicated areas, other Agencies within the basin, and areas covered by an Alternative.
 - 3) Jurisdictional boundaries of federal or state land (including the identity of the agency with jurisdiction over that land), tribal land, cities, counties, agencies with water management responsibilities, and areas covered by relevant general plans.
 - 4) Existing land use designations and the identification of water use sector and water source type.
 - 5) The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the department, as specified in section 353.2, or best available information.

2.1 Summary of Jurisdictional Areas and Other Features

Legal Requirements:

§354.8(b) A written description of the Plan area, including a summary of the jurisdictional areas and other features depicted on the map.

2.2 Water Resources Monitoring and Management Programs

2.2.1 Monitoring and management programs

Legal Requirements:

§354.8(c) Identification of existing water resource monitoring and management programs, and description of any such programs the Agency plans to incorporate in its monitoring network or in development of its Plan. The Agency may coordinate with existing water resource monitoring and management programs to incorporate and adopt that program as part of the Plan.

§354.8(d) A description of how existing water resource monitoring or management programs may limit operational flexibility in the basin, and how the Plan has been developed to adapt to those limits.

2.2.2 Conjunctive use programs

Legal Requirements:

§354.8(e) A description of conjunctive use programs in the basin.

2.3 Relation to General Plans

2.3.1 Summary of general plans/other land use plans

Legal Requirements:

§354.8(f) A plain language description of the land use elements or topic categories of applicable general plans that include the following:

- 1) A summary of general plans and other land use plans governing the basin.

2.3.2 Impact of GSP on water demands

Legal Requirements:

§354.8(f) (2) A general description of how implementation of existing land use plans may change water demands within the basin or affect the ability of the Agency to achieve sustainable groundwater management over the planning and implementation horizon, and how the Plan addresses those potential effects.

This section will be written later in the GSP process.

2.3.3 Impact of GSP on land use plan assumptions

Legal Requirements:

§354.8(f) (3) A general description of how implementation of the Plan may affect the water supply assumptions of relevant land use plans over the planning and implementation horizon.

2.3.4 Permitting new or replacement wells

Legal Requirements:

§354.8(f) (4) A summary of the process for permitting new or replacement wells in the basin, including adopted standards in local well ordinances, zoning codes, and policies contained in adopted land use plans.

This section will be written later in the GSP process.

2.3.5 Land use plans outside the basin

Legal Requirements:

§354.8(f) (5) To the extent known, the Agency may include information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management.

2.4 Additional GSP Components

Legal Requirements:

§354.8(g) A description of any of the additional Plan elements included in the Water Code Section 10727.4 that the Agency determines to be appropriate.

- 2.4.1 Saline water intrusion
- 2.4.2 Wellhead protection
- 2.4.3 Migration of contaminated groundwater
- 2.4.4 Well abandonment/well destruction program
- 2.4.5 Replenishment of groundwater extractions
- 2.4.6 Conjunctive use
- 2.4.7 Well construction policies
- 2.4.8 Groundwater projects
- 2.4.9 Efficient water management practices
- 2.4.10 Relationships with state and federal agencies
- 2.4.11 Land use planning
- 2.4.12 Impacts on groundwater dependent ecosystems

2.5 Notice and Communication

- 2.5.1 Description of beneficial uses and users

Legal Requirements:

§354.10 Each plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:

- (a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.
- (b) A list of public meetings at which the Plan was discussed or considered by the Agency.
- (c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.

- 2.5.2 Decision-making process

Legal Requirements:

§354.10 (d) A communication section of the Plan that includes the following:

- 1) An explanation of the Agency's decision-making process.

- 2.5.3 Public engagement / Public outreach plan

Legal Requirements:

§354.10 (d)(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.

2.5.4 Encouraging active involvement

Legal Requirements:

§354.10 (d)

- 3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of population within the basin.
- 4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.

3 Basin Setting

3.1 HYDROGEOLOGIC CONCEPTUAL MODEL

3.1.1 Introduction

Legal Requirements:

§354.14(a) Each Plan shall include a descriptive hydrogeologic conceptual model of the basin based on technical studies and qualified maps that characterizes the physical components and interaction of the surface water and groundwater systems in the basin.

3.1.2 Lateral Basin Boundaries

Legal Requirements:

§354.14(b)(2) The hydrogeologic conceptual model shall be summarized in a written description that includes lateral basin boundaries, including major geologic features that significantly affect groundwater flow.

3.1.3 Regional Geologic and Structural Setting

Legal Requirements:

§354.14(b)(1) The hydrogeologic conceptual model shall be summarized in a written description that includes the regional geologic and structural setting of the basin including the immediate surrounding area, as necessary for geologic consistency.

§354.14(b)(3) The hydrogeologic conceptual model shall be summarized in a written description that includes the definable bottom of the basin.

3.1.4 Topographic Information

Legal Requirements:

§354.14(d)(1) Physical characteristics of the basin shall be represented on one or more maps that depict topographic information derived from the U.S. Geological Survey or another reliable source.

3.1.5 Surficial Geology

Legal Requirements:

§354.14(d)(2) Physical characteristics of the basin shall be represented on one or more maps that depict surficial geology derived from a qualified map including the locations of cross-sections required by this Section.

Soil Characteristics

Legal Requirements:

§354.14(d)(3) Physical characteristics of the basin shall be represented on one or more maps that depict soil characteristics as described by the appropriate Natural Resource Conservation Service soil survey or other applicable studies.

3.1.6 Cross-sections

Legal Requirements:

§354.14(c) The hydrogeologic conceptual model shall be represented graphically by at least two scaled cross-sections that display the information required by this section and are sufficient to depict major stratigraphic and structural features in the basin.

3.1.7 Aquifer System

Legal Requirements:

§354.14(b)(4) The hydrogeologic conceptual model shall be summarized in a written description that includes the principal aquifers and aquitards.

§354.14(b)(4)(c) Structural properties of the basin that restrict groundwater flow within the principal aquifers, including information regarding stratigraphic changes, truncation of units, or other features.

3.1.7.1 Aquifer Characteristics and Properties

Legal Requirements:

§354.14(b)(4)(b) Physical properties of aquifers and aquitards, including the vertical and lateral extent, hydraulic conductivity, and storativity, which may be based on existing technical studies or other best available information.

3.1.7.2 Aquifer Uses

Legal Requirements:

§354.14(b)(4)(e) Identification of the primary use or uses of each aquifer, such as domestic, irrigation, or municipal water supply.

3.1.7.3 Geologic Formations

Legal Requirements:

§354.14(b)(4)(a) Formation names, if defined.

3.1.8 General Groundwater Quality

Legal Requirements:

§354.14(b)(4)(d) General water quality of the principal aquifers, which may be based on information derived from existing technical studies or regulatory programs.

3.1.9 Surface Water Features

§354.14(d)(5) Physical characteristics of the basin shall be represented on one or more maps that depict surface water bodies that are significant to the management of the basin.

3.1.10 Source & Point of Delivery of Imported Water

Legal Requirements:

§354.14(d)(6) Physical characteristics of the basin shall be represented on one or more maps that depict the source and point of delivery for imported water supplies.

3.1.11 Recharge and Discharge Areas

Legal Requirements:

§354.14(d)(4) Physical characteristics of the basin shall be represented on one or more maps that depict delineation of existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas, including significant active springs, seeps, and wetlands within or adjacent to the basin.

3.2 Current and Historical Groundwater Conditions

Legal Requirements:

§354.16 Each Plan shall provide a description of current and historical groundwater conditions in the basin, including data from January 1, 2015, to current conditions, based on the best available information that includes the following:

3.2.1 Groundwater level data

Legal Requirements:

§354.16(a) Groundwater elevation data demonstrating flow directions, lateral and vertical gradients, and regional pumping patterns, including:

1. Groundwater elevation contour maps depicting the groundwater table or potentiometric surface associated with the current seasonal high and seasonal low for each principal aquifer within the basin.
2. Hydrographs depicting long-term groundwater elevations, historical highs and lows, and hydraulic gradients between principal aquifers.

3.2.2 Groundwater Movement

3.2.3 Estimate of Groundwater Storage

Legal Requirements:

§354.16(b) A graph depicting estimates of the change in groundwater in storage, based on data, demonstrating the annual and cumulative change in the volume of groundwater in storage between seasonal high groundwater conditions, including the annual groundwater use and water year type.

3.2.4 Seawater Intrusion

Legal Requirements:

§354.16(c) Seawater intrusion conditions in the basin, including maps and cross-sections of the seawater intrusion front for each principal aquifer.

3.2.5 Groundwater Quality Issues

Legal Requirements:

§354.16(d) Groundwater quality issues that may affect the supply and beneficial uses of groundwater, including a description and map of the location of known groundwater contamination sites and plumes.

3.2.6 Land Subsidence Conditions

Legal Requirements:

§354.16(e) The extent, cumulative total, and annual rate of land subsidence, including maps depicting total subsidence, utilizing data available from the Department, as specified in Section 353.2, or best available information.

3.2.6.1 Review of Existing Data

3.2.6.2 Subsidence Monitoring Results

3.2.7 Surface Water and Groundwater Interconnections

Legal Requirements:

§354.16(f) Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or best available information.

3.2.7.1 Interconnected Surface Water Systems

3.2.8 Groundwater Dependent Ecosystems

Legal Requirements:

§354.16(g) Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or best available information.

3.3 Water Budget Information

Legal Requirements:

§354.18

- (a) Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.

3.3.1 Description of Groundwater Model

Legal Requirements:

§354.18

- (c) Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow. If a numerical groundwater and surface water model is not used to quantify and evaluate the projected water budget conditions and the potential impacts to beneficial uses and users of groundwater, the Plan shall identify and describe an equally effective method, tool, or analytical model to evaluate projected water budget conditions.
- (f) The Department shall provide the California Central Valley Groundwater-Surface Water Simulation Model (C2VSIM) and the Integrated Water Flow Model (IWFM) for use by Agencies in developing the water budget. Each Agency may choose to use a different groundwater and surface water model, pursuant to Section 352.4.

3.3.2 Description of inflows, outflows, and change in storage

Legal Requirements:

§354.18(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:

- (1) Total surface water entering and leaving a basin by water source type.
- (2) Inflow to the groundwater system by water source type, including subsurface groundwater inflow and infiltration of precipitation, applied water, and surface water systems, such as lakes, streams, rivers, canals, springs and conveyance systems.
- (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow.

3.3.3 Quantification of overdraft

Legal Requirements:

§354.18(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:

- (4) The change in the annual volume of groundwater in storage between seasonal high conditions.
- (5) If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.
- (6) The water year type associated with the annual supply, demand, and change in groundwater stored.

3.3.1 Estimate of sustainable yield

Legal Requirements:

§354.18(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:

- (7) An estimate of sustainable yield for the basin.

3.3.2 Current, historical, and projected water budget

Legal Requirements:

§354.18

- (c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:
- (1) Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, water demand, and land use information.
 - (2) Historical water budget information shall be used to evaluate availability or reliability of past surface water supply deliveries and aquifer response to water supply and demand trends relative to water year type. The historical water budget shall include the following:
 - (A) A quantitative evaluation of the availability or reliability of historical surface water supply deliveries as a function of the historical planned versus actual annual surface water deliveries, by surface water source and water year type, and based on the most recent ten years of surface water supply information.
 - (B) A quantitative assessment of the historical water budget, starting with the most recently available information and extending back a minimum of 10 years, or as is sufficient to calibrate and reduce the uncertainty of the tools and methods used to estimate and project future water budget information and future aquifer response to proposed sustainable groundwater management practices over the planning and implementation horizon.
 - (C) A description of how historical conditions concerning hydrology, water demand, and surface water supply availability or reliability have impacted the ability of the Agency to operate the basin within sustainable yield. Basin hydrology may be characterized and evaluated using water year type.
 - (3) Projected water budgets shall be used to estimate future baseline conditions of supply, demand, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:
 - (A) Projected hydrology shall utilize 50 years of historical precipitation, evapotranspiration, and streamflow information as the baseline condition for estimating future hydrology. The projected hydrology information shall also be applied as the baseline condition used to evaluate future scenarios of hydrologic uncertainty associated with projections of climate change and sea level rise.
 - (B) Projected water demand shall utilize the most recent land use, evapotranspiration, and crop coefficient information as the baseline condition for estimating future water demand. The projected water demand information shall also be applied as the baseline condition used to evaluate future scenarios of water demand uncertainty associated with projected changes in local land use planning, population growth, and climate.
 - (C) Projected surface water supply shall utilize the most recent water supply information as the baseline condition for estimating future surface water supply. The projected surface water supply shall also be applied as the baseline condition used to evaluate future scenarios of surface water supply availability and reliability as a function of the historical surface water supply identified in Section 354.18(c)(2)(A), and the projected changes in local land use planning, population growth, and climate.
- (d) The Agency shall utilize the following information provided, as available, by the Department pursuant to Section 353.2, or other data of comparable quality, to develop the water budget:
- (1) Historical water budget information for mean annual temperature, mean annual precipitation, water year type, and land use.
 - (2) Current water budget information for temperature, water year type, evapotranspiration, and land use.
 - (3) Projected water budget information for population, population growth, climate change, and sea level rise.

3.3.3 Surface water supply available for recharge

3.4 Management Areas

Legal Requirements:

§354.20 (a) Each Agency may define one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin.

(b) A basin that includes one or more management areas shall describe the following in the Plan:

3.4.1 Reason for creation of each Management Area

Legal Requirements:

§354.20 (b) (1) The reason for the creation of each management area.

3.4.2 Minimum Thresholds and Measurable Objectives

Legal Requirements:

§354.20 (b) (2) The minimum thresholds and measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.

3.4.3 Level of monitoring and analysis

Legal Requirements:

§354.20 (b) (3) The level of monitoring and analysis appropriate for each management area.

3.4.4 Description of Management Areas

Legal Requirements:

§354.20 (b) (4) An explanation of how the management area can operate under different minimum thresholds and measurable objectives without causing undesirable results outside the management area, if applicable.

(c) If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.

4 Sustainable Management Criteria

Legal Requirements:

§354.22 This Subarticle describes criteria by which an Agency defines conditions in its Plan that constitute sustainable groundwater management for the basin, including the process by which the Agency shall characterize undesirable results, and establish minimum thresholds and measurable objectives for each applicable sustainability indicator.

4.1 Sustainability Goal

Legal Requirements:

§354.24 Each Agency shall establish in its Plan a sustainability goal for the basin that culminates in the absence of undesirable results within 20 years of the applicable statutory deadline. The Plan shall include a description of the sustainability goal, including information from the basin setting used to establish the sustainability goal, a discussion of the measures that will be implemented to ensure that the basin will be operated within its sustainable yield, and an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation and is likely to be maintained through the planning and implementation horizon.

4.2 Undesirable Results

4.2.1 Criteria to Define Undesirable Results

Legal Requirements:

§354.26 (a) Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin.

4.2.2 Causes of Groundwater Conditions That Could Lead to Undesirable Results

Legal Requirements:

§354.26 (b) The description of undesirable results shall include the following:

- (1) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.
- (2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.
- (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.

4.2.3 Evaluation of Multiple Minimum Thresholds

Legal Requirements:

§354.26 (c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.

4.2.4 Sustainability Indicators Not Present In Basin

Legal Requirements:

§354.26 (d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.

4.3 minimum thresholds

Legal Requirements:

§354.28 (a) Each Agency in its Plan shall establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26.

(d) An Agency may establish a representative minimum threshold for groundwater elevation to serve as the value for multiple sustainability indicators, where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual minimum thresholds as supported by adequate evidence.

(e) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish minimum thresholds related to those sustainability indicators.

4.3.1 Description of minimum thresholds

Legal Requirements:

§354.28 (b) The description of minimum thresholds shall include the following:

(1) The information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by uncertainty in the understanding of the basin setting.

(2) The relationship between the minimum thresholds for each sustainability indicator, including and explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.

(3) How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.

(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

(5) How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.

(6) How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.

4.3.2 Relationship for each sustainability indicator

Legal Requirements:

§354.28 (c) Minimum thresholds for each sustainability indicator shall be defined as follows:

(1) Chronic Lowering of Groundwater Levels. The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Minimum thresholds for chronic lowering of groundwater levels shall be supported by the following:

(A) The rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin.

(B) Potential effects on other sustainability indicators.

(2) Reduction of Groundwater Storage. The minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.

(3) Seawater Intrusion. The minimum threshold for seawater intrusion shall be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results. Minimum thresholds for seawater intrusion shall be supported by the following:

(A) Maps and cross-sections of the chloride concentration isocontour that defines the minimum threshold and measurable objective for each principal aquifer.

(B) A description of how the seawater intrusion minimum threshold considers the effects of current and projected sea levels.

(4) Degraded Water Quality. The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be used on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.

(5) Land Subsidence. The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. Minimum thresholds for land subsidence shall be supported by the following:

(A) Identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects.

(B) Maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum threshold and measurable objectives.

(6) Depletions of Interconnected Surface Water. The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results. The minimum threshold established for depletions of interconnected surface water shall be supported by the following:

(A) The location, quantity, and timing of depletions of interconnected surface water.

(B) A description of the groundwater and surface model used to quantify surface water depletion. If a numerical groundwater and surface water model is not used to quantify surface water depletion, the Plan shall identify and describe an equally effective method, tool, or analytical model to accomplish the requirements of this Paragraph.

- 4.3.3 Selection of minimum thresholds to avoid Undesirable Results
- 4.3.4 Impact of Minimum Thresholds on water uses and users
- 4.3.5 Measurement of minimum thresholds
- 4.3.6 Minimum Thresholds for Management Areas

4.4 Measurable Objectives

Legal Requirements:

§354.30 (a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin with 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.

(b) Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.

(c) Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.

(d) An Agency may establish a representative measurable objective for groundwater elevation to serve as the value for multiple sustainability indicators where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual measurable objectives as supported by adequate evidence.

(e) Each Plan shall describe a reasonable path to achieve the sustainability goal for the basin within 20 years of Plan implementation, including a description of interim milestones for each relevant sustainability indicator, using the same metric as the measurable objective, in increments of five years. The description shall explain how the Plan is likely to maintain sustainable groundwater management over the planning and implementation horizon.

(f) Each Plan may include measurable objectives and interim milestones for additional Plan elements described in Water Code Section 10727.4 where the Agency determines such measures are appropriate for sustainable groundwater management in the basin.

(g) An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for finding of inadequacy of the Plan.

- 4.4.1 Description of measureable objectives
- 4.4.2 Margin of safety for measureable objectives
- 4.4.3 Path to achieve measureable objectives
 - 4.4.3.1 Interim milestone at 5 years
 - 4.4.3.2 Interim milestone at 10 years
 - 4.4.3.3 Interim milestone at 15 years
 - 4.4.3.4 Milestone at 20 years

5 Monitoring Network

5.1.1 Description of monitoring network

Legal Requirements:

§354.34(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:

Groundwater Levels

Legal Requirements:

§354.34(c)(1) Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:

- A. A sufficient density of monitor wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.
- B. Static groundwater elevation measurements shall be collected at least two times per year, to represent seasonal low and seasonal high groundwater conditions.

Groundwater Storage

Legal Requirements:

§354.34(c)(2) Reduction of Groundwater Storage. Provide an estimate of the change in annual groundwater in storage.

Seawater Intrusion

Legal Requirements:

§354.34(c)(3) Seawater Intrusion. Monitor seawater intrusion using chloride concentrations, or other measurements convertible to chloride concentrations, so that the current and projected rate and extent of seawater intrusion for each applicable principal aquifer may be calculated.

Water Quality

Legal Requirements:

§354.34(c)(4) Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.

Land Subsidence

Legal Requirements:

§354.34(c)(5) Land Subsidence. Identify the rate and extent of land subsidence, which may be measured by extensometers, surveying, remote sensing technology, or other appropriate method.

Depletion of Interconnected Surface Water

Legal Requirements:

§354.34(c)(6) Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:

- A. Flow conditions including surface water discharge, surface water head, and baseflow contribution.
- B. Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.
- C. Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.
- D. Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.

5.1.2 Adequacy of monitoring network

Legal Requirements:

§354.34(d) The monitoring network shall be designed to ensure adequate coverage of sustainability indicators. If management areas are established, the quantity and density of monitoring sites in those areas shall be sufficient to evaluate conditions of the basin setting and sustainable management criteria specific to that area.

5.1.3 Density of monitoring sites and frequency of measurements

Legal Requirements:

§354.34(f) The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:

- 1) Amount of current and projected groundwater use.
- 2) Aquifer characteristics, including confined or unconfined aquifer conditions, or other physical characteristics that affect groundwater flow.
- 3) Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.
- 4) Whether the Agency has adequate long-term existing monitoring results or other technical information to demonstrate an understanding of aquifer response.

5.1.4 Monitoring Network Information

Legal Requirements:

§354.34(g) Each Plan shall describe the following information about the monitoring network:

5.1.4.1 Scientific rationale for site selection

Legal Requirements:

§354.34(g)(1) Scientific rationale for the monitoring site selection process.

5.1.4.2 Consistency with data and reporting standards

Legal Requirements:

§354.34(g)(2) Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.

5.1.4.3 Corresponding sustainability indicator, minimum threshold, measurable objective, and interim milestone

Legal Requirements:

§354.34(g)(3) For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.

5.1.5 Monitoring locations map

Legal Requirements:

§354.34(h) The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.

5.2 Monitoring Protocols

Legal Requirements:

§354.34(i) The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.

5.3 Representative Monitoring

Legal Requirements:

§354.36 Each Agency may designate a subset of monitoring sites as representative of conditions in the basin or an area of the basin, as follows:

5.3.1 Description of representative sites

Legal Requirements:

§354.36(a) Representative monitoring sites may be designated by the Agency as the point at which sustainability indicators are monitored, and for which quantitative values for minimum thresholds, measurable objectives, and interim milestones are defined.

5.3.2 Use of groundwater elevations as proxy for other sustainability indicators

Legal Requirements:

§354.36(b) Groundwater elevations may be used as a proxy for monitoring other sustainability indicators if the Agency demonstrates the following:

- 1) Significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy.
- 2) Measurable objectives established for groundwater elevation shall include a reasonable margin of operational flexibility taking into consideration the basin setting to avoid undesirable results for the sustainability indicators for which groundwater elevation measurements serve as a proxy.

5.4 Assessment and Improvement of Monitoring Network

5.4.1 Review and evaluation of monitoring network

Legal Requirements:

§354.38(a) Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.

5.4.2 Identification of data gaps

Legal Requirements:

§354.38(b) Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.

5.4.3 Plans to fill data gaps

Legal Requirements:

§354.38(c) If the monitoring network contains data gaps, the Plan shall include a description of the following:

- 1) The location and reason for data gaps in the monitoring network.
- 2) Local issues and circumstances that limit or prevent monitoring.

(d) Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.

5.4.4 Monitoring frequency and density

Legal Requirements:

§354.38(e) Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:

- 1) Minimum threshold exceedances.
- 2) Highly variable spatial or temporal conditions.
- 3) Adverse impacts to beneficial uses and users of groundwater.
- 4) The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.

5.5 Reporting Monitoring Data to the Department

Legal Requirements:

§354.40 Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.

6 Projects and Management Actions to Achieve Sustainability

6.1 Project #1 Description

- 6.1.1 Measureable objectives
- 6.1.2 Circumstances for implementation
- 6.1.3 Permitting and regulatory process
- 6.1.4 Project schedule
- 6.1.5 Project benefits
- 6.1.6 Project implementation
- 6.1.7 Legal authority
- 6.1.8 Project cost estimate/acre-foot of yield
- 6.1.9 Management of groundwater extractions and recharge

6.2 Project #X Description

7 Plan Implementation

- 7.1 Estimate of GSP Implementation Costs
- 7.2 Identify Funding Alternatives
- 7.3 Schedule for Implementation
- 7.4 Data Management System
- 7.5 Annual Reporting
- 7.6 Periodic Evaluations

8 References and Technical Studies

Appendices

- Interagency Agreements
- Technical Appendices
- Groundwater Model Documentation
- Comments and Responses